CHAPTER 3 – AFFECTED ENVIRONMENT

3.1 INTRODUCTION AND OVERVIEW

This chapter describes the affected environment (environmental setting) relevant to the assessment of the effect of the Desert Harvest Solar Project (DHSP). It provides information on the physical, biological, cultural, socioeconomic, and other resources that have the potential to affect or be affected by activities related to implementing the proposed project or alternatives that are described in detail in Chapter 2. These resources include those that occur within the project study area, as defined for each resource. More detailed information for some resources (noise, air quality and greenhouse gases, biological resources, water supply, and traffic) is provided in the technical reports or supporting information provided as technical appendices to this EIS. For the purpose of this document, the environmental setting, or "baseline," used for the impact analysis reflects conditions at the commencement of environmental analysis in September 2011. This baseline includes partial ongoing construction of the adjacent Desert Sunlight Solar Farm Project, for which Phase 1A was under construction at the commencement of analysis for this EIS. Phase 1A of the Desert Sunlight Solar Farm Project is shown on Figure 3.1-1 in Appendix A.

The following resources are evaluated in this EIS:

- Air resources
- Biological resources – vegetation
- Biological resources – wildlife
- Climate change
- Cultural resources
- Paleontological resources
- Fire and fuels management
- Soils and geology
- Energy and minerals
- Lands and realty
- Public health and safety
- Recreation
- Social and Economic Setting
- Environmental justice
- Special designations
- Transportation and public access
- Visual resources
- Water resources
- Wastes – solid and hazardous
- CDCA plan conformance
- Native American concerns

Resources that do not exist in the project study area and, therefore, do not warrant analysis in the EIS and proposed Plan Amendment include:

- Grazing
- Wild Horses and Burros

For each resource, a discussion of applicable plans, policies, and regulations is provided in this chapter. All applicable federal, state, and local laws, regulations, and policies are summarized and their applicability to the project explained. It is assumed in the analysis that the Applicant (EDF) will fully comply with all laws and regulations applicable to project actions, will prepare any required plans, and will obtain any necessary permits or waivers.

The environmental setting (existing conditions) of the project study area is described using information from literature reviews, fieldwork, and input from appropriate federal, state, and local agencies. The resource sections in this chapter define and describe a resource-specific study area or "region of influence", which serves to define the geographic boundaries of the area for which

baseline information is presented. Defining these conditions (such as existing air quality, biological and cultural resources, water resources, and recreational opportunities) allows for appropriate characterization and anticipation of the project's impacts and forms the basis for the environmental analysis.

Sources for the literature reviews include published technical reports, internet resources, data from government sources, aerial photographs, and information provided by the Applicant. Where existing information regarding the project study area was insufficient or outdated, or where surveys or studies were specifically required by jurisdictional agencies, surveys and studies were conducted to determine the existing environmental conditions. This work included producing original studies for biological and cultural resources, air quality, transportation and public access, and visual resources.

As discussed in Chapter 1, this EIS provides the required environmental review under the National Environmental Policy Act (NEPA). In addition, because this project will require permits from the County of Riverside, this EIS was written to both comply with NEPA and satisfy the California Environmental Quality Act (CEQA) requirements for those project components that require entitlements from state and local agencies, in accordance with CEQA Guidelines Section 15221. Due to the similarity in information requirements for both NEPA and CEQA, the affected environment described in this chapter serves both purposes.

3.2 AIR RESOURCES

This section describes the environmental and regulatory settings associated with the construction and operation of the proposed project and its alternatives with respect to air resources in the project study area. The project study area for air resources includes the Mojave Desert Air Basin, which encompasses activities from the proposed project and alternatives, as this is the limit of the area likely to be affected by the Desert Harvest Solar Project (DHSP) with respect to air resources.

The term "pollutant emissions" refers to the amount (mass) of a contaminant released into the atmosphere by a source. Emission rates are the quantity of pollutants emitted during a specified increment of time or during a specified increment of emission source activity. Typical measurement units for emission rates on a time basis include pounds per hour, pounds per day, or tons per year. Typical emission factors on a source activity basis include pounds per thousand gallons of fuel burned, pounds per ton of material processed, and grams per vehicle mile of travel.

The term "ambient air quality" refers to the atmospheric concentration of a contaminant in a specified volume of air, and this is determined at a particular geographic location that is usually some distance from the source of the relevant emissions. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million by volume). The ambient air quality levels actually measured at a particular location are determined by the interactions among three groups of factors:

- Emissions: the types, amounts, and locations of pollutants emitted into the atmosphere;
- Meteorology: the physical processes affecting the transport, mixing, and removal of pollutants; and
- Chemistry: any chemical reactions that transform pollutant emissions into other chemical substances.

Air pollutants are often characterized as being "primary" or "secondary" pollutants. Primary pollutants are those emitted directly into the atmosphere (such as carbon monoxide, sulfur dioxide, lead particulates, and hydrogen sulfide). Secondary pollutants are those (such as ozone, nitrate particles, or sulfate particles) formed through chemical reactions in the atmosphere; these chemical reactions usually involve primary pollutants, normal constituents of the atmosphere, and other secondary pollutants. Compounds that react to form secondary pollutants are referred to as reactive pollutants or precursors. Some air pollutants (such as many organic gases and respirable particulate matter) are a combination of primary and secondary pollutants.

3.2.1 Applicable Plans, Policies, and Regulations

Air Quality Planning Programs

Since 1970, the federal Clean Air Act (CAA) has required each state to identify areas that have ambient air quality in violation of federal standards. States are required to develop, adopt, and implement a SIP to achieve, maintain, and enforce federal ambient air quality standards in these nonattainment areas. The SIP process includes specific deadlines for achieving the federal ambient air quality standard once a nonattainment designation has been made. Deadlines for achieving the federal air quality standards vary according to air pollutant and the severity of existing air quality problems. The SIP must be submitted to and approved by EPA. SIP ele-

ments are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated. Development of SIP documents is formally the responsibility of the relevant state air quality management agency, and in California, local/regional air quality management agencies and local/regional transportation planning agencies assume the primary responsibility for SIP document preparation, with state oversight and approval.

The status of areas with respect to each federal ambient air quality standard is typically categorized as nonattainment (in violation of a national standard), attainment (in compliance with a national standard), unclassifiable, or attainment/unclassified. For most air pollutants, initial federal status designations are made using only two categories: nonattainment or unclassifiable/attainment. The unclassified designation includes attainment areas as well as areas that are expected to attain the standards although monitoring data are lacking. Areas that have been reclassified from nonattainment to attainment are automatically considered "maintenance areas."

The California Clean Air Act of 1988 created a state air quality planning program similar to the federal SIP process for areas that violate state ambient air quality standards. CARB designates areas as attainment, nonattainment, or unclassified with respect to each of the state ambient air quality standards. Local air quality management agencies, in consultation with the relevant council of governments, are responsible for preparing and updating state air quality management plans for pollutants other than particulate matter. CARB is responsible for air quality planning efforts addressing the state ambient air quality standards for particulate matter (PM10 and PM2.5). The state air quality planning process differs from the federal SIP process in one respect: while there are requirements to show on-going improvement in air quality, there are no specific deadlines for achieving state air quality standards.

The geographic basis for attainment status designations varies and can be based on political boundaries; metropolitan statistical area boundaries; areas defined by township and range; areas defined by highways or topographic features; or areas defined by a combination of these types of boundaries. The largest geographic units used for attainment status designations are called air quality control regions (EPA terminology) or air basins (CARB terminology). Air quality control regions and air basins are typically defined by a combination of political boundaries (often county boundaries) and topographic features that influence meteorological conditions and pollutant transport.

Riverside County has adopted an air quality element in the County General Plan. The air quality element includes policies supporting regional cooperation with other jurisdictions to improve air quality; requiring compliance with federal, state, and regional air quality regulations; encouraging programs to reduce vehicle travel; encouraging energy conservation in urban land uses; and encouraging development patterns that improve the County's jobs/housing balance.

Air Quality Standards

Federal and state air quality management programs use two distinct management approaches:

- The State Implementation Plan (SIP) process of setting ambient air quality standards for acceptable health-based exposure to air pollutants, conducting monitoring programs to identify locations experiencing air quality problems, and then developing programs and regulations designed to reduce or eliminate those problems; and

- The Hazardous Air Pollutant (HAP) regulatory process identifying specific chemical substances that are known to be hazardous to human health, and then setting emission standards to regulate the amount of those substances that can be released by specific facilities or types of equipment.

Criteria Air Pollutants

Air quality programs based on ambient air quality standards typically address air pollutants that are produced in large quantities by widespread types of emission sources and which are of public health concern. The U.S. Environmental Protection Agency (EPA) defines ambient air quality standards for several different pollutants, which often are referred to as criteria pollutants (ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, and particulate matter). Standards for particulate matter cover two size fractions: inhalable particulate matter (PM10) and fine particulate matter (PM2.5). Federal ambient air quality standards are based primarily on evidence of acute and chronic health effects. Federal ambient air quality standards apply to outdoor locations to which the general public has access.

California has adopted state-level ambient air quality standards in different forms than the comparable federal standards or to address pollutants that are not covered by federal standards. Most state ambient air quality standards are based on health effects data, but they can also reflect other considerations such as protection of crops, protection of materials, or avoidance of nuisance conditions (such as objectionable odors). Table 3.2-1 summarizes ambient air quality standards adopted by EPA and the California Air Resources Board (CARB).

Table 3.2-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	National Standard
Ozone (O3)	1-hour	0.09 ppm	—
	8-hour	0.070 ppm	0.075 ppm
Respirable particulate matter (PM10)	24-hour	50 µg/m^3	150 µg/m^3
	Annual	20 µg/m^3	—
Fine particulate matter (PM2.5)	24-hour	—	35 µg/m^3
	Annual	12 µg/m^3	15 µg/m^3
Carbon monoxide (CO)	1-hour	20 ppm	35 pm
	8-hour	9.0 ppm	9.0 ppm
Nitrogen dioxide (NO_2)	1-hour	0.18 ppm	0.100 ppm*
	Annual	0.030 ppm	0.053 ppm
Sulfur dioxide (SO_2)	1-hour	0.25 ppm	0.075 ppm*
	3-hour	—	0.5 ppm
	24-hour	0.04 ppm	0.14 ppm
	Annual	—	0.03 ppm

Source: CARB 2011a.
ppm = parts per million; µg/m^3 = micrograms per cubic meter; "—" = no standard.
Note:
*The new federal 1-hour NO_2 and SO_2 standards are based on the 98th and 99th percentile of daily hourly maximum values, respectively.

Hazardous Air Pollutants

Air quality programs based on regulation of other hazardous substances typically address chemicals used or produced by limited categories of industrial facilities. Programs regulating HAPs focus on: substances that alter or damage the genes and chromosomes in cells (mutagens); substances that affect cells in ways that can lead to uncontrolled cancerous cell growth (carcinogens); substances that can cause birth defects or other developmental abnormalities (teratogens); substances with serious acute toxicity effects; and substances that undergo radioactive decay processes, resulting in the release of ionizing radiation. Federal air quality management programs for HAPs focus on setting emission limits for particular industrial processes rather than setting ambient exposure standards. California has established exposure guidelines for various hazardous air pollutants, and toxic air contaminants are regulated as part of the permit review process for stationary sources.

Visibility

The federal CAA requires EPA to administer programs so that all areas of the country achieve the federal ambient air quality standards within various specified time frames. For attainment areas that already meet the federal ambient air quality standards, the federal Prevention of Significant Deterioration (PSD) permit program includes a three-tier classification defining the extent to which baseline air quality conditions can be degraded. Class I areas have the smallest allowable air quality deterioration limits. Class II areas allow greater deterioration of air quality but must maintain air quality conditions better than the federal air quality standards. Class III areas allow deterioration of air quality to the level of the federal ambient air quality standards. There are currently 163 Class I areas designated in the United States, with 29 Class I areas in California. All areas outside Class I areas are currently designated as Class II areas because there are no Class III areas. The Class I area closest to the proposed project and alternatives is the Joshua Tree National Park (JTNP), 1.8 miles from the solar facility. Visibility is considered an important air quality value to be protected within JTNP. There are no other Class I areas within 62 miles (100 kilometers) of the solar facility. The San Jacinto Wilderness west of Palm Springs is about 72 (116 kilometers) miles from the solar facility, and the San Gorgonio Wilderness in San Bernardino County is about 85 (137 kilometers) miles northwest of the solar facility.

The federal CAA requires EPA to protect visibility conditions within the federal Class I areas. The CAA also requires development of programs to remedy existing visibility impairment in Class I areas if that visibility impairment results from man-made air pollution. EPA has identified two general types of visibility impairment at Class I areas:

- Impairment due to smoke, dust, colored gases, or layered haze attributable to individual stationary sources; and
- Impairment due to widespread, regionally homogeneous haze resulting from the cumulative emissions of varied stationary, mobile, and area sources in a region.

The PSD permit program addresses visibility impairment from nearby stationary sources. Regional haze impacts resulting from cumulative emissions in a region are being addressed through new SIP planning requirements. Visibility impairment, whether from stationary sources or from other sources, must be addressed under the regional haze program.

Monitoring of aerosol and other regional haze parameters occurs through a cooperative of federal agencies and the Inter-agency Monitoring of Protected Visual Environments (IMPROVE) program, which tracks visibility conditions in or near Class I areas across the country. There are 18 active IMPROVE monitoring sites in California, including one in JTNP.

Other air quality related values (AQRV) include deposition of pollutants to soil or water. Deposition of compounds including nitrogen and sulfur is monitored in JTNP by the Clean Air Status and Trends Network (CASTNET). At the JTNP site, total nitrogen deposition rates have been in a downward trend since 1996, and total sulfur deposition rates have been relatively steady over the same timeframe.

Regulatory Considerations

In general, states or tribal authorities take primary responsibility for enforcing most federal stationary source emission standards and new source review requirements, with EPA exercising formal review and oversight responsibilities. Many states have independent air quality permit programs that extend to emission sources not covered by federal requirements. State air quality permit requirements generally are integrated with federal requirements, resulting in a consolidated permit program. Under most consolidated permit programs, basic state permit requirements apply to all sources that are not specifically exempted. Additional requirements (including EPA review of the permit) become applicable if stationary sources exceed various size or emission thresholds.

In California, air quality regulation is a joint responsibility between CARB and local air quality management agencies. Local agencies are either a single county or a multi-county agency, typically called an Air Pollution Control District (APCD) or an Air Quality Management District (AQMD). APCDs and AQMDs have primary responsibility for most air quality regulatory programs, with CARB retaining oversight responsibilities. CARB directly implements statewide regulatory programs for motor vehicles, portable equipment, and HAPs. Two different AQMDs have jurisdiction over portions of Riverside County. The South Coast Air Quality Management District (SCAQMD) has jurisdiction over most of Riverside County and the Mojave Desert Air Quality Management District (MDAQMD) has jurisdiction over the far eastern portion of Riverside County.

The project study area is entirely under the jurisdiction of the SCAQMD. Most construction equipment items are classified as mobile sources, and thus are exempt from stationary source permit requirements. But other portable and stationary equipment such as generators, compressors, pumps, welders, diesel pile driving hammers, concrete batch plants, sand and gravel screening equipment, rock crushers, wood chippers, and tub grinders are potentially subject to SCAQMD permit requirements. SCAQMD Rule 219 list equipment types that are typically exempt from permit requirements. Equipment normally exempt from stationary source permit requirements includes:

- Equipment using a piston type internal combustion engine (typically using diesel, gasoline, or compressed gas fuels) that has a manufacturer rating of 50 horsepower or less;
- Equipment using a gas turbine engine that has a maximum heat input rate of 2,975,000 British thermal units (BTU) or less;
- Concrete mixers with a working capacity of one cubic yard or less;

- Portable equipment registered under the CARB statewide portable engine registration that remains at one fixed location for no more than 12 months; and
- Rental equipment located at one facility for no more than 12 months when the equipment owner has a valid AQMD permit or has registered the equipment under the statewide portable engine registration program.

The CARB statewide portable engine registration program is a voluntary program that establishes uniform emission limits and other requirements for eligible equipment. CARB-registered portable equipment items are exempt from local air district regulations and permit requirements as long as the equipment does not remain at a single fixed location (other than an equipment storage area) for more than 12 months (CARB 2011b). Portable equipment that is not registered under the statewide program or that remains at a single fixed location for 12 consecutive months or more is subject to local air district regulations and permit requirements unless it qualifies for exemption under other provisions of local air district rules and regulations. CARB-registered portable equipment remains exempt from air district permit requirements if it is relocated periodically within a project site for legitimate operational purposes, and is not at any single fixed location for 12 consecutive months.

In addition to possible permit requirements for some equipment used during project construction, the SCAQMD has adopted other regulations that affect facility construction and operation. Construction activities would be subject to fugitive dust control requirements (Rule 403). Rule 403 prohibits creation of dust plumes that are visible beyond the property line of the emission source, and requires all "active operations" (construction/demolition activities, earthmoving activities, heavy or light duty vehicle movements, or creation of disturbed surface areas) to implement applicable best available control measures as defined in the Rule. Best available dust control measures outlined in SCAQMD Rule 403 are summarized in Table 3.2-2. Enhanced dust control requirements apply if the project is considered a large operation. A large operation under Rule 403 is any active operations on property which contains 50 or more acres of disturbed surface area, or any earthmoving operation with a daily throughput volume of 5,000 cubic yards or more three or more times during the most recent 365-day period.

Table 3.2-2. Best Available Dust Control Measures Required by SCAQMD Rule 403

Dust Source	Required Control Measures	Guidance
Mechanical or manual demolition	• Stabilize wind-erodible surfaces to reduce dust. • Stabilize surface soil where support equipment and vehicles will operate. • Stabilize loose soil and demolition debris. • Comply with AQMD Rule 1403 (asbestos from demolition and renovation).	• Apply water in sufficient quantities to prevent visible dust plumes.
Cut and fill	• Water soils before cutting and filling. • Stabilize soils during and after cutting and filling.	• For large sites, water with sprinklers or water trucks and allow time for water to penetrate. • Water soils to depth of cut before subsequent cuts.
Earthmoving	• Water to depth of proposed cuts. • Reapply water as necessary to maintain dampness in soils and to ensure that visible dust does not extend more than 100 feet in any direction. • Stabilize soils once earthmoving is complete.	• Grade each project phase separately, timed to coincide with construction phase. • Install upwind fencing to reduce material movement on-site. • Apply water or a stabilizing agent in sufficient quantity to prevent the generation of dust.

Table 3.2-2. Best Available Dust Control Measures Required by SCAQMD Rule 403

Dust Source	Required Control Measures	Guidance
Importing/ exporting bulk materials	• Stabilize material while loading to reduce dust emissions. • Maintain at least 6 inches of freeboard on haul vehicles. • Stabilize material while transporting to reduce dust emissions. • Stabilize material while unloading to reduce dust emissions. • Comply with Vehicle Code Section 23114.	• Use tarps or other suitable enclosures on haul trucks. • Check belly-dump truck seal regularly and remove any trapped rocks to prevent spillage. • Comply with track-out prevention and mitigation requirements. • Apply water while loading and unloading to reduce dust.
Stockpiles and bulk material handling	• Stabilize stockpiled material. • Stockpiles within 100 yards of off-site occupied buildings must not be greater than 8 feet high, or must have a road bladed to the top to allow water truck access, or must have an operational water irrigation system capable of completely covering the stockpile.	• Add and remove material from the downwind portion of the stockpile. • Maintain storage piles to avoid steep sides or faces.
Truck loading	• Water material before loading. • Ensure that freeboard exceeds 6 inches (California Vehicle Code Section 23114).	• Ensure that the loader bucket is close to the truck to minimize drop height while loading. • Empty loader bucket so that no dust is generated.
Staging areas	• Stabilize staging areas during use. • Stabilize staging area soils at project completion.	• Limit the size of staging areas. • Limit vehicle speeds to 15 miles per hour. • Limit the size and number of staging area entrances and exits.
Traffic areas for construction activity	• Stabilize all off-road traffic, parking areas, and haul routes. • Direct construction traffic over established haul routes.	• Apply gravel or paving as soon as possible to haul routes that will become future roadways. • Construct barriers to restrict vehicles to established haul routes and parking areas.
Road shoulder maintenance	• Apply water to unpaved road shoulders prior to clearing. • Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	• Installation of curbing and/or paving or road shoulders can reduce recurring maintenance costs. • Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs.
Disturbed soil	• Stabilize disturbed soil throughout the construction site and between structures.	• Limit vehicle traffic and disturbances on soils where possible. • If interior block walls are planned, install them as soon as possible. • Apply water or stabilizing agents in sufficient quantity to prevent the generation of dust.
Trenching	• Stabilize surface soils where trenchers, excavators, or support equipment will operate. • Stabilize soils at completion of trenching.	• Water soils before trenching. For deep trenching, first trench to 18 inches and soak deeper soils before continuing to trench to final depth. • Wash mud and soil from trenching equipment at the conclusion of trenching.
Screening	• Water material before screening. • Limit fugitive emissions to comply with opacity and plume length standards. • Stabilize material immediately after screening.	• Dedicate a water truck or high capacity hose to screening operations. • Drop material through screen slowly and minimize drop height. • Install a wind barrier with a porosity of no more than 50 percent and a height equal to the drop height on the upwind side of screening equipment.

Table 3.2-2. Best Available Dust Control Measures Required by SCAQMD Rule 403

Dust Source	Required Control Measures	Guidance
Unpaved roads and parking lots	• Stabilize soils to meet applicable performance standards. • Limit vehicle travel to established haul roads and parking lots.	• Restrict vehicle movements to established haul roads and parking lots to reduce the area requiring stabilization.
Landscaping	• Stabilize soils, materials, and slopes.	• Apply water to stabilize materials. • Maintain materials in a crusted condition. • Maintain effective cover over materials. • Stabilize sloping surfaces with soil binders until vegetation or ground cover can stabilize the slopes. • Hydroseed before the rainy season.
Turf overseeding	• Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards. • Cover haul vehicles prior to exiting the site.	• Haul waste material immediately off-site.
Vacant land	• In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking, and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees, or other effective control measures.	

Source: SCAQMD 2005, Rule 403.

In addition to the dust control requirements in Table 3.2-2, Table 3.2-3 identifies enhanced dust control requirements applicable to especially large operations, which are any active operations on property containing 50 or more acres of disturbed surface area; or any earth-moving operations with a daily earth-moving or throughput volume of 3,850 cubic meters (5,000 cubic yards) or more three times during the most recent 365-day period. The proposed project and alternatives would not include any large operation activities after completing construction.

Table 3.2-3. Enhanced Dust Control Measures Required for Large Operations by SCAQMD Rule 403

Dust Source	Dust Control Measure
Earthmoving: Construction cut areas and mining	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Earthmoving: Construction fill areas	Maintain soil moisture content at a minimum of 12 percent, as determined by the American Society for Testing and Materials (ASTM) Method D-2216 or other equivalent method approved by the Executive Officer, the CARB, and the EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method D-1557 or other equivalent method approved by the Executive Officer, the CARB, and the EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.

Table 3.2-3. Enhanced Dust Control Measures Required for Large Operations by SCAQMD Rule 403

Dust Source	Dust Control Measure
Earthmoving except for mining operations or construction cut and fill areas	Either: Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM Method D-2216 or other equivalent method approved by the Executive Officer, the CARB, and the EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations. Or: For any earthmoving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Disturbed surface areas: Completed grading areas	Either: Apply soil stabilizers within five working days of grading completion. Or: Apply water to at least 80 percent of all inactive disturbed surface areas (excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions) on a daily basis when there is evidence of wind-driven fugitive dust. Or: Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter.
Disturbed surface areas except for completed grading areas	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind-driven fugitive dust, must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Inactive disturbed surface areas	Either: Apply water to at least 80 percent of all inactive disturbed surface areas (excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions) on a daily basis when there is evidence of wind-driven fugitive dust. Or: Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface. Or: Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter. Or: Use any combination of the above control actions such that, in total, these actions apply to all inactive disturbed surface areas.
Open storage piles	Either: Apply chemical stabilizers. Or: Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind-driven fugitive dust. Or: Install temporary coverings. Or: Install a three-sided enclosure with walls having no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.
Unpaved roads	Either: Water all roads used for any vehicular traffic at least once every 2 hours during active operations (3 times per normal 8-hour work day). Or: Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour. Or: Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
All sources	Any other control measures approved by the Executive Officer and the EPA as equivalent to the measures specified in this table may also be used.

Source: SCAQMD 2005, Rule 403.

Additionally, State regulations for diesel-fueled sources (California Code of Regulations, Title 13, Section 2449) would also affect construction activity. State regulations limit the unnecessary idling of diesel off-highway vehicle and equipment engines (CARB 2008a and 2008b). Except when necessary for normal equipment operations, vehicle queuing, engine testing and maintenance, or for operator comfort and safety, vehicle idling for more than five minutes is prohibited.

As currently proposed, the project facilities would not require any stationary emission sources (such as backup generators) for facility operations. Power from existing local distribution lines would provide backup power to key facilities during DHSP operations. Although no SCAQMD air permits would be required for project operations, various SCAQMD regulations would apply to the project. Paints or other architectural coatings used at facility buildings or on facility equipment would be subject to the volatile organic compound limits of SCAQMD Rule 1113. Cleaning solvents used for facility maintenance operations also may be subject to various requirements outlined in SCAQMD Rule 442 (Usage of Solvents) and SCAQMD Rule 1171 (Solvent Cleaning Operations).

Clean Air Act Conformity

Section 176(c) of the CAA requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. EPA has promulgated separate rules that establish conformity analysis procedures for transportation (highway/mass-transit) projects (40 CFR Part 93, Subpart A) and for other general federal agency actions (40 CFR Part 93, Subpart B). General conformity requirements are potentially applicable to many federal agency actions, but apply only to those aspects of an action that involve on-going federal agency responsibility and control over direct or indirect sources of air pollutant emissions.

The EPA conformity rule establishes a process that is intended to demonstrate that the proposed federal action:

- Would not cause or contribute to new violations of federal air quality standards;
- Would not increase the frequency or severity of existing violations of federal air quality standards; and
- Would not delay the timely attainment of federal air quality standards.

The EPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements of the conformity rule are called *de minimis* levels. Emissions associated with stationary sources that are subject to permit programs incorporated into the SIP are not counted against the *de minimis* threshold.

Compliance with the conformity rule can be demonstrated in several ways. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant *de minimis* level. If net emissions increases exceed the relevant *de minimis* value, a formal conformity determination process must be followed. Federal agency actions subject to the general conformity rule cannot proceed until there is a demonstration of consistency with the SIP.

3.2.2 Existing Conditions

Climate

The Colorado Desert has a typical desert climate, having extreme daily temperature changes, low annual precipitation, strong seasonal winds, and mostly clear skies. The annual highest tempera-

ture in the Colorado Desert exceeds 100°F and the average daily temperature variation is 35 degrees in the summer and 30 degrees in the winter. Winter temperatures are more moderate, with mean maximum temperatures in the low 60s and lows in the low or mid 30s. According to the California Department of Fish and Game (DFG), "The Colorado Desert's climate distinguishes it from other deserts. The region experiences greater summer daytime temperatures than higher-elevation deserts and almost never experiences frost. In addition, the Colorado Desert, especially toward the southern portion of the region, experiences two rainy seasons per year, in the winter and late summer, while the more northerly Mojave Desert has only winter rains" (DFG 2007). The City of Twentynine Palms, located 45 miles northwest of the DHSP, has a total average annual precipitation of less than four and a half inches (WRCC 2011). Approximately 48 percent of the annual precipitation occurs in the winter season, between December and March. However, occasional heavy precipitation occurs in the summer due to thunderstorms as monthly average data (WRCC 2011) shows 38 percent of the annual precipitation occurs in July, August, and September.

Air Quality

The air pollutants of greatest concern in Riverside County are ozone and particulate matter (PM10 and PM2.5). The seriousness of air pollution problems is greatest in the urbanized western portions of Riverside County and least in the eastern portion of Riverside County. Portions of Riverside County fall into three separate air basins:

- The South Coast Air Basin in western Riverside County (west of San Gorgonio Pass and the San Jacinto Mountains),
- The Salton Sea Air Basin in the Coachella Valley portion of Riverside County (between the San Jacinto Mountains and the Little San Bernardino Mountains), and
- The Mojave Desert Air Basin in eastern Riverside County (east of the Little San Bernardino Mountains, north of the Cottonwood Mountains, and east of the Orocopia Mountains).

The project study area is located in the SCAQMD-jurisdiction portion of the Mojave Desert Air Basin. Most air quality monitoring stations in Riverside County are in the South Coast Air Basin and Salton Sea Air Basin portions of the County. There are no air quality monitoring stations in the immediate vicinity of the DHSP. An air quality monitoring station in Blythe (46.5 miles east-southeast of the project site) measures only ozone levels. The National Park Service operates three air quality monitoring stations in JTNP. These monitoring stations measure ozone, sulfur dioxide, and PM10 concentrations.

There are several monitoring stations in the Riverside County and Imperial County portions of the Salton Sea Air Basin, but all of those monitoring stations are influenced by pollutant transport from the South Coast Air Basin. In addition, some of the Imperial County monitoring stations are influenced by pollutant transport from Mexico. Because the monitoring stations in JTNP and those in the Salton Sea Air Basin are more strongly influenced by pollutant transport from the South Coast Air Basin than in the project study area, data from those monitoring stations are not considered representative of air quality conditions in the project study area.

All federal ambient air quality standards, except the ozone standard, are currently being met in the Mojave Desert Air Basin portion of Riverside County, and State standards for ozone and PM10 are occasionally exceeded, resulting in a state designation of nonattainment for those two

pollutants. Table 3.2-4 provides a summary of the last three years of available ambient monitoring data. Presented ozone data are collected from JTNP Monitoring Station located 26 miles from the project site and PM10 data are collected from Indio-Jackson Street Monitoring Station located 49 miles from the project site.

Table 3.2-4. Background Ambient Air Quality Data

	Number of Days Exceeding NAAQS			Number of Days Exceeding CAAQS			Maximum Concentration (ppm or µg/m³) [a]		
Pollutant	2008	2009	2010	2008	2009	2010	2008	2009	2010
1-Hour Ozone	—	—	—	36	24	19	0.140	0.121	0.119
8-Hour Ozone	72	59	53	108	90	90	0.110	0.104	0.105
24-Hour PM10 – Federal	—	—	—	—	—	—	128.0	132.0	107.0
24-Hour PM10 – State	—	—	—	76.3	24 [b]	23.9	129.0	131.0	108.0
Annual PM10 – State	—	—	—	—	—	—	39.8	31.8	29.7

Source: CARB 2011d.

ppm = parts per million; µg/m³ = micrograms per cubic meter; NA = Not Available; "—" = Not Applicable.

Note:

[a] Gaseous pollutant (ozone) concentrations are shown in ppm and particulate (PM10) concentrations are shown in µg/m³.

[b] Number of days exceeding CAAQS is estimated by multiplying 6 by the number of measured days exceeding CAAQS as measurement are collected every six days.

Table 3.2-5 lists the federal and state attainment status designations applicable to the Mojave Desert Air Basin portion of Riverside County.

Table 3.2-5. Federal and State Attainment Status Designations in the Mojave Desert Air Basin Portion of Riverside County

Pollutant	Federal Designation	State Designation
Ozone	Unclassified/Attainment	Nonattainment
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Carbon Monoxide	Unclassified/Attainment	Unclassified
Sulfur Dioxide	Unclassified	Attainment
PM10 (Inhalable Particulate Matter)	Unclassified	Nonattainment
PM2.5 (Fine Particulate Matter)	Unclassified/Attainment	Unclassified
Lead	No Federal Designation	Attainment
Sulfates	No Federal Standard	Attainment

Source: USEPA 2011a; CARB 2011c

Areas with unclassified or unclassified/attainment designations are treated as attainment areas. Because there are no federal nonattainment or maintenance designations in the Mojave Desert portion of Riverside County, federal agency actions in the Mojave Desert Air Basin portion of Riverside County are not subject to CAA conformity review requirements.

Visibility

The National Park Service has been monitoring visibility conditions in JTNP since 2001. Visibility can be impaired by haze caused by fine particles in the air, including dust. However, visibility monitoring data at JTNP suggest that the worst visibility days at JTNP are caused by high concentrations of ammonium nitrate (IMPROVE 2011).

Emission Sources

The dominant emission sources in the project area are mobile sources (traffic) on I-10, Highway 177, and other area roadways, agricultural operations on private lands, recreational vehicle use on public and private lands, fuel combustion associated with development, use of surrounding residential land uses, and wind erosion from lands with sparse vegetation. Current ongoing dust and vehicle emissions also occur in the immediate vicinity of the solar facility as a result of ongoing construction of the Desert Sunlight Solar Farm project, immediately north of the solar facility.

Ground Conditions Affecting Wind Erosion

Wind can move soil particles by three general processes: surface creep (rolling along the ground surface), saltation (a bouncing movement along the ground surface caused by particle collisions that help force a particle into the air for a brief time before it falls back to the ground), and suspension transport (particles lofted into the air and remaining suspended for more than a minute). Surface creep and saltation typically account for most soil mass movement associated with wind erosion, and normally involve larger sand-size soil particles. Suspension transport normally involves smaller silt and clay size soil particles. From an air pollution standpoint, suspension transport of soil particles is the wind erosion process that generates fugitive dust.

The extent of fugitive dust generated by wind erosion is affected by numerous factors, including:

- Soil texture (the mix of clay, silt, and sand sized particles in a soil);
- Particle aggregation (mostly due to clay content);
- Organic matter content of soils;
- Non-erodible surface features (gravel, rocks, boulders, rock outcrops, etc.);
- Extent and density of vegetation cover;
- Surface crusting – mineral or biological crusts – especially between vegetation stems;
- Soil moisture conditions;
- Wind speed;
- Vertical air turbulence;
- Sedimentation of erodible material from upslope water erosion or from flood deposits; and
- Active disturbance of surface soils.

Soil moisture conditions and surface conditions are important factors determining the vulnerability of an area to wind erosion. In desert areas, soil moisture levels are high only during and after rainfall or flash flood events. Consequently, soil moisture levels in desert areas are high enough to influence wind erosion processes for only brief intermittent periods.

The surface features of greatest importance are non-erodible surface material, vegetation cover, mineralized soil crusts, and biological soil crusts. Biological soil crusts are formed by living organisms and their by-products, creating a crust of soil particles bound together by organic materials. The most common types of non-erodible surface materials in deserts include scattered rocks and boulders, rock formation outcrops, and desert pavement. Desert pavements are areas with rock fragments of pebble to cobble size that cover an underlying layer of sand, silt, or clay. Desert pavement areas typically have little or no vegetation cover. The extent to which desert

pavement reduces wind erosion and resulting fugitive dust depends on the density of the rock fragments covering the underlying soil.

Desert pavements seem to form from two different processes (McAuliffe 2011). On rocky alluvial fans, fine dust settling out of the air accumulates between and below the surface layer of rocks, eventually forming a thin silt and clay layer that separates the surface rocks from the main part of the alluvial fan. Desert pavement also can form on sandy soils that contain significant amounts of gravel and rock fragments. In such situations, wind and water erosion can remove most of the sand and fine sediments from the surface, leaving the remaining rock fragments as the predominant surface layer.

3.3 BIOLOGICAL RESOURCES – VEGETATION

This section describes the environmental and regulatory settings associated with the construction and operation of the proposed project and its alternatives with respect to vegetation resources in the project study area. The project study area for vegetation resources includes the portion of the Chuckwalla Valley and surrounding mountains within a 5-mile radius of the proposed project and alternatives, as this is the limit of the area likely to be affected by the Desert Harvest Solar Project (DHSP) with respect to vegetation resources.

3.3.1 Applicable Plans, Policies, and Regulations

Federal Regulations

Endangered Species Act of 1973

The Endangered Species Act (ESA) (16 USC 1531 et seq.) and subsequent amendments establish legal requirements for the conservation of endangered and threatened species and the ecosystems upon which they depend.

Section 7

Section 7 of the ESA requires federal agencies, in consultation with, and with the assistance of the Secretary of the Interior or the Secretary of Commerce, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service share responsibilities for administering the Act. All federally listed threatened and endangered species that could be affected by the DHSP are under the jurisdiction of the USFWS. Regulations governing interagency cooperation under Section 7 are found at 50 CFR Part 402. The biological opinion (BO) issued by USFWS at the conclusion of a formal Section 7 consultation may include a statement authorizing a take that may occur incidental to an otherwise legal activity.

Critical Habitat

Critical habitat is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation. Designation of an area as critical habitat provides a means by which the habitat of an endangered or threatened species can be protected from adverse changes or destruction resulting from federal activities or projects. A critical habitat designation does not set up a preserve or refuge and usually applies only when federal funding, permits, or projects are involved. Critical habitat requirements do not apply to citizens engaged in activities on private land that do not involve a federal agency.

Section 9

Section 9 of the ESA lists those actions that are prohibited under the ESA, including take (i.e., to harass, harm, pursue, hunt, shoot, wound, trap, kill, capture, or collect or attempt to engage in

any such conduct) of listed species without special exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or shelter. "Harass" is further defined as actions that create the likelihood of injury to listed species to an extent as to significantly disrupt normal behavior patterns which include breeding, feeding, and shelter.

Clean Water Act

The Clean Water Act (33 USC 1251 et seq.) establishes legal requirements for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters.

Section 401

Section 401 requires that an applicant for a federal license or permit that allows activities resulting in a discharge to waters of the United States must obtain a State certification that the discharge complies with other provisions of the Clean Water Act. The Regional Water Quality Control Boards administer the certification program in California.

Section 404

Section 404 establishes a permit program administered by the U.S. Army Corps of Engineers (USACE) regulating the discharge of dredged or fill material into waters of the United States, including wetlands. Implementing regulations by the USACE are found at 33 CFR Parts 320-330. Guidelines for implementation are referred to as the Section 404(b)(1) Guidelines and were developed by the EPA in conjunction with the USACE (40 CFR Parts 230). The Guidelines allow the discharge of dredged or fill material into the aquatic system only if there is no practicable alternative that would have less adverse impacts.

California Desert Protection Act of 1994

This act expanded Death Valley and Joshua Tree National Parks, and established the Mojave National Preserve, and the Granite Mountains National Reserve. It also declared certain lands in the California desert as wilderness, and included other natural resource designations and provisions.

Noxious Weed Act of 1974, as amended

This act provides for the control and management of nonindigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. Under this act, the Secretary of Agriculture was given the authority to designate plants as noxious weeds, and inspect, seize and destroy products, and to quarantine areas, if necessary to prevent the spread of such weeds.

Lacey Act, as amended (16 USC 3371-3378)

This act protects plants and wildlife by creating civil and criminal penalties for a wide variety of violations including illegal take, possession, transport, or sale of protected species.

Executive Order 11988 – Floodplain Management

This order directs all federal agencies to avoid the long-term and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

Executive Order 11990 – Protection of Wetlands

This order directs all federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

Executive Order 13112 – Invasive Species

This order directs federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. To do this, the order established the National Invasive Species Council; currently there are 13 Departments and Agencies on the Council.

Compliance with Floodplain and Wetland Environmental Review Requirements

Established under 10 CFR Part 1022, this regulation establishes policy and procedures relating to the Department of Energy's (DOE) responsibilities under Executive Order (EO) 11988 and 11990, including:

- DOE policy regarding the consideration of floodplain and wetland factors in DOE planning and decision-making; and
- DOE procedures for identifying proposed actions located in a floodplain or wetland, providing opportunity for early public review of such proposed actions, preparing floodplain or wetland assessments, and issuing statements of findings for actions in a floodplain.

To the extent possible, DOE shall accommodate the requirements of EO 11988 and EO 11990 through applicable DOE NEPA procedures or, when appropriate, the environmental review process under the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC. 9601 et seq.).

Executive Order 13212 – Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use

Approved on May 18, 2001, EO 13212 directs federal agencies involved in reviewing energy-related projects to streamline their internal approval processes and establish an interagency task force to coordinate federal efforts at expediting approval mechanisms. The interagency task force will be established to monitor and assist the agencies in the efforts to expedite their review of permits or similar actions, as necessary, to accelerate the completion of energy-related projects, increase energy production and conservation, and improve transmission of energy. This task force also shall monitor and assist agencies in setting up appropriate mechanisms to coordinate federal, State, tribal, and local permitting in geographic areas where increased permitting activity is expected.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. 661 666) applies to any federal project where the waters of any stream or other body of water are impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with the USFWS and the appropriate state wildlife agency. These agencies prepare reports and recommendations that document project effects on wildlife and identify measures that may be adopted to prevent loss or damage to wildlife resources. The term "wildlife" includes both animals and plants. Provisions of the Act are implemented through the NEPA process and Section 404 permit process.

State Laws and Regulations

Natural Community Conservation Planning Act, as amended (Fish and Game Code Section 2800-2835)

The Natural Community Conservation Planning (NCCP) Act of 1991 (amended in 2002) was established to provide a regional approach to conservation for multiple species, in contrast to the single-species approach implemented under CESA and the federal ESA. The NCCP Program is implemented by CDFG as a cooperative effort by the State of California and private and public partners, designed to protect species and their habitats through an ecosystem approach. The program helps identify and provide for large area-wide protection of plants, animals, and their habitats while allowing for compatible and appropriate economic activity.

The NCCP Act promotes conservation of unfragmented habitat areas, promotes multispecies and multihabitat management and conservation, and promotes the conservation of broad-based natural communities and species diversity. It provides an option for identifying mitigation that is proportional to a project's impacts to biological resources. Participation in the NCCP program is a voluntary mechanism that can provide an early planning framework for proposed development projects.

The Desert Renewable Energy Conservation Plan (DRECP) is a NCCP being developed by BLM, USFWS, CDFG, and the California Energy Commission (CEC). It is intended to protect California desert ecosystems (including those in the project area), while allowing for appropriate development of renewable energy projects. The DRECP is scheduled to be completed in 2012. The DHSP site is within the geographic area to be covered by the DRECP.

Native Plant Protection Act

Prior to enactment of CESA and the federal ESA, California adopted the Native Plant Protection Act (NPPA, Fish and Game Code 1900-1913), authorizing the California Fish and Game Commission to designate rare or endangered native plants, and requiring State agencies to use their authority to carry out programs to conserve these plants. CESA (above) generally replaces the NPPA for plants originally listed as endangered under the NPPA. However, plants listed as rare retain that designation, and take is regulated under provisions of the NPPA. The Act prohibits the taking of listed plants from the wild and requires notification of the CDFG at least 10 days in advance of activities that may result in take, to allow CDFG to salvage listed plant species that would otherwise be destroyed.

California Desert Native Plants Act

The California Desert Native Plants Act protects California desert native plants from unlawful harvesting on both public and privately owned lands within Imperial, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego Counties. The following native plants, or any part thereof, may not be harvested except under a permit issued by the commissioner or the sheriff of the county in which the native plants are growing: all species of the Agavaceae (century plants, nolinas, and yuccas); all species of the family Cactaceae; all species of the family Fouquieriaceae (ocotillo, candlewood); all species of the genus *Prosopis* (mesquites); all species of the genus *Cercidium* (paloverdes); catclaw acacia (*Acacia greggii*); desert holly (*Atriplex hymenelytra*); smoke tree (*Dalea spinosa*); and desert ironwood (*Olneya tesota*), both dead and alive (provision 80073). This provision excludes any plant that is declared to be a rare, endangered, or threatened species by federal or State law or regulations, including, but not limited to, the California State Fish and Game Code. The fee for the permit to remove any of these plants will not be less than $1 per plant, except for Joshua trees (*Yucca brevifolia*), which will not be less than $2 per plant.

Streambed Alteration Agreements, California Fish and Game Code, Sections 1600 – 1616

Under these sections of the Fish and Game Code, an applicant is required to notify CDFG prior to constructing a project that would divert, obstruct or change the natural flow, bed, channel, or bank of a river, stream, or lake. Preliminary notification and project review generally occur during the environmental review process. When a fish or wildlife resource may be substantially adversely affected, CDFG is required to propose reasonable project changes to protect the resource. These modifications are formalized in a Streambed Alteration Agreement that becomes part of the plans, specifications, and bid documents for the project. CDFG jurisdiction is determined to occur within the water body of any natural river, stream or lake. The term "stream," which includes creeks and rivers, is defined in Title 14, CCR, Section 1.72.

Bureau of Land Management Plans and Guidelines

California Desert Conservation Area Plan: Vegetation Element

The California Desert Conservation Area (CDCA) is a 25-million-acre expanse of land in southern California designated by Congress in 1976 through the Federal Land Policy and Management Act (FLPMA). The BLM administers about 10 million of those acres. When Congress created the CDCA, it recognized its special values, proximity to the population centers of southern California, and the need for a comprehensive plan for managing the area. Congress stated that the CDCA Plan must be based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The proposed project and alternatives fall within the CDCA.

The Vegetation Element of the CDCA Plan contains the following goals: to conserve federally and State-listed rare, threatened, or endangered plants and to further the purposes of the ESA and similar State laws; to treat unusual plant assemblages that rate as highly sensitive and very sensitive in a manner that will preserve their habitat and ensure their continued existence; to manage wetland and riparian areas in the desert; to sustainably maintain the continued existence and biological viability of the vegetation resource in the CDCA while providing for the consumptive needs of wildlife, livestock, wild horses and burros, and public uses; to provide guidance for the manipulation of plant habitats or vegetation; and to encourage the use of private desert lands for

commercial production of valuable desert plants. The plan identifies the need for monitoring efforts and directing these efforts to those areas with the greatest management need.

Northern and Eastern Colorado Desert Coordinated Management Plan/EIS

The Northern and Eastern Colorado Desert Coordinated Management Plan/EIS (NECO Plan/EIS) is a landscape-scale, multi-agency planning effort that seeks to protect and conserve natural resources while simultaneously balancing human uses of the California portion of the Sonoran Desert ecosystem. The NECO planning area, which is located in the southeastern CDCA, encompasses over 5 million acres and hosts 60 sensitive plant and animal species. The NECO Plan/EIS amends BLM's CDCA Plan (BLM and CDFG 2002; BLM 2002). This multiple use planning effort also takes into account other uses of the desert, such as hiking, hunting, rock hounding, off-highway recreation, commercial mining, livestock grazing, and utility transmission. The NECO Plan/EIS provides integrated ecosystem management for special-status species and natural communities for all federal lands, and regional standards for public land health for BLM lands.

BLM Sensitive Species

BLM Sensitive Species are species designated by the State Director that are not federally listed, proposed, or candidate species. BLM's policy is to "ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered." Various offices of the BLM maintain lists of sensitive plant and wildlife species that are to be considered as part of the management activities carried out by the BLM on the lands that they administer.

Cacti and Yucca Removal Guidelines

The BLM normally requires transplanting or salvage of certain native plant species that would be lost to development on lands under its jurisdiction. Species that typically require salvage in this region include yuccas (*Yucca* spp.), ocotillo (*Fouquieria splendens*), and cacti.

Regional and Local Regulations

County of Riverside General Plan

The open space policy relevant to vegetation is defined in the Desert Center Area Plan (DCAP) within the Riverside County General Plan as follows:

DCAP 10.1 Encourage clustering of development for the preservation of contiguous open space.

3.3.2 Environmental Setting

The proposed project and alternatives would be located in the upper Chuckwalla Valley, on public lands administered by the BLM in unincorporated Riverside County, 6 miles north of Desert Center, California. The project would be located in the Colorado Desert region of the larger Sonoran Desert. Within California, the 7-million-acre Colorado Desert region extends from the border of the higher-elevation Mojave Desert in the north to the Mexican border in the south, and from the Laguna Mountains of the Peninsular Ranges in the west to the Colorado River in the east.

The Colorado Desert is generally at lower elevation than the Mojave Desert to the north, and much of the land lies below 1,000 feet above mean sea level (AMSL). Mountain peaks rarely exceed 3,000 feet AMSL. This desert experiences more summer precipitation than the northern deserts, and although annual precipitation is low overall, a substantial portion of it falls during August and September, usually as brief and intense thunderstorms. Average annual rainfall recorded at the Eagle Mountain weather station (Station No. 042598), located 2.5 miles west of the solar facility site, is 3.68 inches (9.35 cm; WRCC 2011). Common habitat types of the Colorado Desert include coarse sandy bajadas and alluvial fans supporting shrublands dominated by creosote bush, saltbush, and other shrubs; valley floors with finer soils, generally supporting saltbush scrub; and rocky mountain slopes supporting a mix of shrubs, cacti, and small trees (such as Joshua trees, junipers, and ocotillos). Less common and often specialized habitats of the Colorado Desert include palm oases, windblown sand dunes, and desert washes dominated by "microphyll" (small-leaved) shrubs and trees, such as desert ironwood and smoke trees. The proposed project and alternative sites lie within the planning area for the NECO, as described above.

The proposed solar facility site is currently undeveloped, natural open space consisting of primarily native vegetation. The surrounding area consists primarily of public lands managed by the BLM with smaller private land parcels to the south and east (see Figure 3.1-1 in Appendix A). The Desert Sunlight Solar Farm (DSSF) project, now under construction, is located adjacent to the northern boundary of the DHSP site and grading and vegetation clearing has occurred on a portion of the DSSF site.

Some of the private lands to the south and east of the DHSP site have been developed as residential and agricultural lands uses and have been cleared of native vegetation. These include active and inactive jojoba fields, rural residential lands, and the community of Lake Tamarisk.

Joshua Tree National Park (JTNP) surrounds the upper Chuckwalla Valley on the north, east, and west. To the north, the JTNP boundary is about 7 miles from the northern boundary of the proposed solar facility, and about 4 miles north of the DSSF site. The Coxcomb Mountains, in the southeastern corner of JTNP, are located about 1.8 miles northeast of the northeastern corner of the proposed solar facility site. To the west, the JTNP boundary is about 3.5 miles from the western boundary of the proposed solar facility site at Kaiser Road.

3.3.3 Methodology

Surveys Conducted for the Desert Sunlight Solar Farm Project

Gen-tie line route Alternatives B (proposed gen-tie), C, and D for the DHSP conform to gen-tie line Alternatives A-1 and A-2, described and analyzed for the DSSF, as incorporated by reference in section 1.11 (BLM 2011a). Recent, complete surveys were conducted along these gen-tie line routes for the DSSF, and the results of those surveys have been used to characterize baseline conditions along gen-tie line routes B, C, and D for the DHSP. Those surveys are described in detail in the DSSF EIS (BLM 2011a) and the DSSF Biological Resources Technical Report (Ironwood 2010) and are incorporated here by reference. Relevant studies and results are summarized below:

- Prior to conducting field surveys for the DSSF, a biological resources literature search was performed to identify resources with the potential to occur along the gen-tie line routes. The

study area for the gen-tie lines included a 400-foot wide study corridor to allow for some degree of flexibility during final engineering design with the assurance that the final disturbance area would be covered by the respective study areas.

- Vegetation and habitat mapping within the gen-tie line corridors was conducted in September 2009. Desert Dry Wash Woodland, Sonoran Desert Scrub, and Developed/Disturbed/Agriculture vegetation and land form coverage types were mapped along the DSSF gen-tie routes A-1 and A-2 (i.e., DHSP gen-tie line Alternatives B, C and D). These vegetation communities are described in Section 3.3.5 below.
- Botanical surveys following protocols established by CDFG, BLM, and USFWS were conducted within the DSSF gen-tie study areas in spring 2010, which followed a winter season with above-average rainfall that resulted in an increased rate of annual plant production from previous drought years. The following special-status plant species were found along the gen-tie routes: crucifixion thorn (DSSF gen-tie lines A-1 and A-2; i.e., DHSP gen-tie line Alternatives B, C, and D), California ditaxis (DSSF gen-tie line A-1; i.e. DHSP gen-tie line Alternatives B and C), and desert unicorn plant (DSSF gen-tie lines A-1 and A-2; i.e., DHSP gen-tie line Alternatives B, C, and D). These species are described below in Section 3.3.7.

Vegetation, Habitat, and Jurisdictional Streambeds

Aspen biologists mapped streambeds and vegetation on the proposed DHSP solar facility site during September and October 2011. Vegetation mapping and jurisdictional delineations of the gen-tie alignment Alternatives B, C, and D are based on the DSSF project EIS and supporting documents. These three alignments conform to alternative gen-tie lines A-1 and A-2, described and analyzed for the DSSF project (BLM 2011a). Aspen biologists reviewed these alignments in the field to ground-truth the prior mapping and descriptions, and to identify any substantial changes that may have taken place. Based on this field verification, the discussion of vegetation on gen-tie alignment Alternatives B and C is based on the DSSF project data. Vegetation mapping of gen-tie alignment Alternative E was completed by Aspen biologists in October 2011, and the jurisdictional delineation for Alternative E was completed in spring of 2012.

Prior to beginning field work, visible streambeds were mapped on USDA 2009 and 2010 NAIP Imagery, resolution of 1 square meter (i.e., the pixels are 1m x 1m) as a GIS shapefile. Streambeds were delineated by field-verifying presence and widths of each channel, and then refining the mapped data. During the initial site visits (8 and 9 September 2011), channel width and depth data were collected at a "sample" series of streambeds within a portion of the site. Based on these field observations, all streambeds were mapped, and channel widths were added to the data set. This method was repeated throughout the proposed solar facility site. It should be noted that, in several areas, dirt roads on the site showed evidence of conveying water and were mapped as streambeds with a channel width equal to the width of the road. The total jurisdictional streambed acreage was calculated as the summed area of jurisdictional channels (i.e., summed length x width of all channels) plus the acreage of adjacent riparian vegetation.

Vegetation was mapped with a minimum mapping unit of about 0.15 acres (6,500 square feet) by comparing vegetation on the proposed solar facility site to aerial imagery (above) during an initial site visit (8 and 9 September 2011) to identify dominant species and determine the extent that they could be distinguished on the image. Based on this field visit, vegetation was mapped as a separate GIS shapefile. The vegetation map and text descriptions (below) were field verified

during follow-up field visits, while walking field transects and by visiting specific points, in conjunction with streambed delineation. All GIS information was digitized in the NAD 83 datum using the California State Plane Zone VI projection to ensure local accuracy when calculating area.

It should be noted that all vegetation maps are subject to some degree of imprecision due to several factors, including:

1. Vegetation types tend to intergrade on the landscape so that there are no true boundaries in the vegetation itself. In these cases, a mapped boundary represents best professional judgment.
2. The published nomenclature and descriptions of vegetation types tend to intergrade; that is, a given stand of vegetation may not match any named type in the classification scheme used. Each polygon is labeled according to the most applicable type in the classification, but there is often some ambiguity among the types.
3. Vegetation tends to be patchy. Small patches of one type are often surrounded by another type. The size of these included patches varies, depending on the minimum mapping units and scale of available aerial imagery.
4. Photo interpretation of visually similar vegetation types may be difficult. While preliminary maps are field-verified to correct potential areas of misidentification on aerial images, some locations within a project site may be inaccessible due to terrain, access restrictions, or safety issues, and therefore must be mapped based on the botanist's best professional judgment. However, for the proposed project and alternatives, field verification was possible for all areas of ambiguity.

Special-Status Plant Species

Field surveys for special-status plants have been conducted during spring and fall throughout the proposed solar facility site and along gen-tie Alternative E. Botanical surveys on the other gen-tie alternative alignments were conducted for the DSSF project EIS (BLM 2011a), and this document incorporates by reference those survey results as described above.

Surveys were conducted throughout the larger, northeastern parcel by AMEC during spring 2010; throughout both parcels by Aspen Environmental Group (Aspen) during fall 2010; throughout the smaller southwestern parcel by Aspen during spring 2011; and along the eastern gen-tie line alignment (Alternative E) by Aspen during fall 2011 and spring 2012. In addition, incidental observations of flora, including special-status species, were recorded during all field work for the vegetation, habitat, and jurisdictional wetlands, described above. The following descriptions of methods and results of botanical surveys are summarized from AMEC's botanical report, with additional information from Aspen's field work. Details of these surveys are included in the Biological Resources Technical Report (BRTR) and BRTR Supplement for Generation Tie-line Alignment Alternative E, located in Appendix C.6 and C.16 respectively.

Prior to field surveys, AMEC and Aspen biologists reviewed available literature to identify special-status biological resources known from the vicinity of the project site. The literature and databases listed below were reviewed. For data sources that are regularly updated, such as the

CNDDB and CNPS records, AMEC and Aspen biologists reviewed the available data several times during the course of the project. Only the most recent citations are included below.

- CDFG California Natural Diversity Database (CNDDB) (CNDDB 2011) for the following 7½-minute USGS topographic quads: Victory Pass, East of Victory Pass, Desert Center, Corn Spring, Coxcomb Mountains, Pinto Wells, Placer Canyon, Buzzard Spring, Hayfield Spring, West of Palen Pass, Palen Lake, and Sidewinder Well;
- California Native Plant Society Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2011), for the same topographic quads provided data on the California Rare Plant Ranks (CRPR) which correspond to the former CNPS rare plant list system;
- Eastern Colorado Desert Coordinated Management (NECO) Plan (BLM and CDFG 2002);
- List of California BLM Sensitive Plants (BLM 2010b);
- Recent environmental documents for nearby projects including the adjacent DSSF project (BLM 2011a), the Palen Solar Power Project (BLM 2010a), and the Genesis Solar Energy Project (BLM 2011b).

Based upon review of the literature, the databases above, and AMEC's consultation with Andrew C. Sanders (UC Riverside Herbarium), a list of special-status plant species with potential to occur in the vicinity of the DHSP was compiled (see Table 3.3-3). Plant taxa were considered to be special-status species if they were classified as one or more of the categories listed in Table 3.3-1:

Table 3.3-1. Definitions of Special-Status Species Considered in the Draft EIS and Plan Amendment

Species Designation	Agency	Definition
Endangered	USFWS	A species that is in danger of extinction throughout all or a significant portion of its range.
Threatened	USFWS	Any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
Candidate	USFWS	A species the USFWS has designated as a candidate for listing under Section 4 of the ESA, published in its annual candidate review, defined as defined as a species for which has sufficient information on its biological status and threats to propose it as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.
Proposed	USFWS	A species that the USFWS has proposed for listing under Section 4 of the ESA, by publishing a Proposed Rule in the Federal Register.
Endangered	CDFG	A native species or subspecies that is in serious danger of becoming extinct throughout all or a significant portion of its range due to one or more causes, including loss or change in habitat, overexploitation, predation, competition, or disease.
Threatened	CDFG	A native species or subspecies that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.
Rare	CDFG	A species that, although not presently threatened with extinction, is in such small numbers throughout its range that it may become endangered if its present environment worsens.
Candidate	CDFG	A native species that has been officially noticed by the California Fish and Game Commission as being under review by the CDFG for addition to the threatened or endangered species lists. CDFG candidate species are given no extra legal protection under state laws.

Table 3.3-1. Definitions of Special-Status Species Considered in the Draft EIS and Plan Amendment

Species Designation	Agency	Definition
CRPR 1A	CDFG/CNPS	Plants presumed to be extinct in California.
CRPR 1B	CDFG/CNPS	Plants rare or endangered in California and elsewhere.
CRPR 2	CDFG/CNPS	Plants rare or endangered in California but more common elsewhere.
CRPR 3	CDFG/CNPS	Plants about which more information is needed – a review list.
CRPR 4	CDFG/CNPS	Plants of limited distribution – a watch list.
NECO Plan/EIS	BLM	Special-status species that were addressed in the NECO Plan/EIS due to management concerns within the NECO Planning Area.
Sensitive	BLM	Plant and wildlife species designated by the BLM State Office (2010); also includes federal Candidate and federally delisted species which were so designated within the last 5 years, and all CRPR 1B species that occur on BLM lands.

Most designated CRPR species also have "threat ranks" as an extension to the rank number, which designates the level of endangerment by a 0.1 to 0.3 ranking. A threat rank of 0.1 indicates that a plant is seriously endangered in California (high degree/immediacy of threat), 0.2 indicates that a plant is fairly endangered in California (moderate degree/immediacy of threat), and 0.3 indicates that a plant is not very endangered in California (low degree/immediacy of threats or no current threats known). All CRPR 1A and some CRPR 3 plants lacking any threat information receive no threat code extension.

The field surveys conformed to the following protocols, as described in more detail in the BRTR.

- Protocols for Surveying and Evaluating Impacts on Special Status Native Plant Populations and Natural Communities (CDFG 2009);
- Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species (BLM 2009); and
- Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants (USFWS 1996).

These surveys included identifying every plant observed within the survey area to the taxonomic level necessary to determine its special status, if any. In most cases, plant taxa were identified to the species, subspecies, or variety level; in some cases, identification to the genus level was sufficient to determine that the plant had no special-status ranking.

The spring 2010 botanical surveys were conducted in a year of higher than average rainfall at the solar facility site. Average annual precipitation recorded at the Eagle Mountain weather station is 3.68 inches (9.35 cm), while the total rainfall for the 2009-2010 rainfall year (1 July through 30 June) was 5.37 in (13.64 cm). Thus, the results of the spring 2010 surveys should represent a large proportion of floristic diversity on the site. However, BLM and CDFG also recommend late-season botanical surveys on desert sites, particularly in the eastern California deserts. The distribution and abundance of many fall-flowering species in the California desert is incompletely documented in literature due to a historic emphasis on spring, rather than fall, field work. Yet a substantial proportion of the flora is made up of annual species that germinate in response to summer rains, or perennial herbs that may flower at any time of year, depending on rainfall (Shreve and Wiggins 1964; Phillips and Comus 2000). Therefore, additional late-season field surveys were conducted to find and identify as many species as possible, to maximize the likeli-

hood that species not known from the area, or not included on a list of "target species" would be documented if they occur on the site. This approach to field work conforms to CDFG (2009) and BLM (2009b) guidelines recommending "floristic" botanical surveys and provides the most thorough practicable botanical inventory of the sites of the proposed solar facility site. Botanical surveys of gen-tie alignment Alternatives B, C and D were conducted for the DSSF project and are incorporated here by reference (see Section 3.3.3). Additional late summer field surveys of gen-tie alignment Alternative E were completed in 2011 and spring surveys were completed during spring 2012. Details of these surveys are located in Appendix C.16. AMEC biologists visited reference populations of two special-status species, Coachella Valley milk-vetch and Harwood's milk-vetch, to confirm that they could be reliably located and identified during the 2010 field surveys. Coachella Valley milk-vetch is the only listed threatened or endangered plant reported from the vicinity and Harwood's milk-vetch is a relatively widespread CNPS List 2.2 species with potential to occur in the project study area. In 2011, Aspen biologists visited reference populations of three additional special-status plants, California ditaxis, Utah vine milkweed, and desert all-thorn, to compare known examples with similar plants on the site of the proposed solar facility and gen-tie Alternative E.

During botanical surveys, all plant species observed were identified in the field or collected for later identification. Plants were identified using keys, descriptions, and illustrations in regional references such as Shreve and Wiggins (1964), Munz (1974), and Baldwin et al. (eds., 2002). All species noted in each survey area are listed in the BRTR (Appendix C.6). In conformance with CDFG guidelines (2009), surveys were (a) conducted during flowering seasons for the special-status plants known from the area, (b) floristic in nature, (c) consistent with conservation ethics, (d) systematically covered all habitat types on the ROW, and (e) well documented, by the BRTR (Appendix C.6 and C.16) and by voucher specimens to be deposited at Rancho Santa Ana Botanic Garden.

Botanical surveys of gen-tie alignment Alternatives B, C, and D were completed during spring 2010 by Ironwood Consulting staff, as described in the DSSF project EIS (BLM 2011a) and supporting documents. These surveys and results are summarized at the beginning of this subsection.

3.3.4 Soils and Topography

The proposed solar facility site is on the bajada downslope from Eagle Mountains and Coxcomb Mountains, at about 600 feet elevation. The northwestern Chuckwalla Valley is a broad alluvial (water transported) system, fed by numerous alluvial fans higher in the watershed. This system flows east and southeast across the site, as a series of many small, braided drainage channels. The site is within a closed basin draining to Palen Dry Lake. Soils are made up of undifferentiated alluvial material, or interbedded clay, silt and gravel carried down the bajada during depositional flood events. Soils generally have high rock and coarse sand content. There are some areas of desert pavement on older alluvium, outside the active drainage channels. There are no aeolian (i.e., wind-blown) sand deposits on the solar facility site, but aeolian sands are located to the east, at the base of the Coxcomb Mountains, and a part of gen-tie alignment Alternative E would cross these sand flats and dunes.

3.3.5 Vegetation Communities

Two vegetation types cover the proposed solar facility site and gen-tie line Alternatives B, C, and D (Figure 3.3-1a and b in Appendix A): Creosote Bush Scrub (*Larrea tridentata* Shrubland

Alliance) and Blue Palo Verde–Ironwood Woodland (*Parkinsonia florida–Olneya tesota* Woodland Alliance) (Sawyer et al. 2009). The Creosote Bush Scrub vegetation is a subset of the Sonoran Creosote Bush Scrub as described by Holland (1986) and is termed Sonoran Desert Scrub in the NECO Plan, and Blue Palo Verde–Ironwood Woodland is a subset of Holland's description of "Desert Dry Wash Woodland," and is covered under that name in the NECO Plan. There also are small areas where natural vegetation has been removed or disturbed for roads and other land uses.

Gen-tie Alternative E, located farther to the east, would cross two additional vegetation or habitat types: Active Sand Dunes and Creosote Bush Scrub (Sonoran Desert Scrub) on Partially Stabilized Sand Fields.

Creosote Bush Scrub (Sonoran Desert Scrub; Bajada/Alluvial Landforms)

Creosote Bush Scrub (Sonoran Desert Scrub) on the solar facility site is characterized by low diversity of shrub species with relatively wide spacing of shrubs, usually with bare ground between shrubs. The dominant species in this vegetation is creosote bush (*Larrea tridentata*). Associated species include white bursage (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), and big galleta grass (*Pleuraphis rigida*). This vegetation also supports a diverse assemblage of seasonal annuals, including desert sunflower (*Geraea canescens*), desert dandelion (*Malacothrix glabrata*), several pincushion species (*Chaenactis* spp.) and several species of cryptantha (*Cryptantha* spp.). The areas mapped as Creosote Bush Scrub (Sonoran Desert Scrub) also include areas of desert pavement with relatively sparse cover of low-statured creosote bush and seasonal annuals such as devil's spineflower (*Chorizanthe rigida*), kidneyleaf buckwheat (*Eriogonum reniforme*), and Emory's rock daisy (*Perityle emoryi*). The total area of Creosote Bush Scrub (Sonoran Desert Scrub) within the proposed solar facility site is approximately 1,026 acres. There is a total of 980 acres of Creosote Bush Scrub in the Alternative 5 site, and 944 acres in the Alternative 6 and Alternative 7 sites (Table 4.3-1 in Section 4.3). Creosote Bush Scrub (Sonoran Desert Scrub) is not considered a sensitive vegetation type by CDFG (CDFG 2010).

Creosote Bush Scrub (Sonoran Desert Scrub) on the proposed solar facility site matches the Desert Scrub wildlife habitat described by Laudenslayer and Boggs (1988). Within the project study area it provides habitat for a variety of wildlife species including burrowing species such as kangaroo rats (*Dipodomys* spp.), pocket mice (*Perognathus* spp.), and desert cottontail (*Sylvilagus audubonii*), and mesopredators such as desert kit fox (*Vulpes macrotis arsipus*) and coyote (*Canis latrans*). This community also serves as habitat for numerous species of reptiles including desert iguana (*Dipsosaurus dorsalis*), sidewinder (*Crotalus cerastes*), desert horned lizard (*Phrynosoma platyrhinos*), Great Basin whiptail (*Aspidocelis tigris*), and zebra-tailed lizard (*Callisaurus draconoides*). Common birds observed within this vegetation community included black-throated sparrow (*Amphispiza bilineata*), Gambel's quail (*Callipepla gambelii*), common raven (*Corvus corax*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*).

Blue Palo Verde–Ironwood Woodland (Desert Dry Wash Woodland)

Blue Palo Verde–Ironwood Woodland (Desert Dry Wash Woodland) occurs throughout the project study area, primarily in dry washes. This vegetation type is characterized by the presence of desert ironwood (*Olneya tesota*) and blue palo verde (*Parkinsonia floridum*). Additional tree

species such as smoketree (*Psorothamnus spinosus*) and cat claw acacia (*Acacia greggii*) also occur, but are uncommon. It is one of several communities included within broader vegetation types called desert wash woodland or microphyll woodland (Holland 1986; Schoenherr and Burk 2007). Vegetation in desert washes is generally taller, up to 9 meters (30 feet) in height, and denser than that of surrounding desert habitats, with the height of the wash vegetation proportional to the size of the arroyo (Laudenslayer 1988). Understory vegetation within these woodlands is composed of species such as big galleta grass, cheesebush (*Ambrosia salsola*), and desert lavender (*Hyptis emoryi*). Blue Palo Verde–Ironwood Woodlands (Desert Dry Wash Woodland) on the site match the Desert Wash wildlife habitat described by Laudenslayer (1988). This vegetation provides greater food, nesting, and cover, and wildlife diversity is generally greater than in the surrounding desert. Examples of species that depend in part on desert microphyll woodlands include vermillion flycatcher (*Pyrocephalus rubinus*), black-tailed gnatcatcher (*Polioptila melanura*), and burro deer (*Odocoileus hemionus eremicus*). In addition, many of the species occupying the surrounding Creosote Bush Scrub (Sonoran Desert Scrub) are found in greater numbers in microphyll woodlands. This community is ranked by CDFG as a sensitive vegetation type, with state rarity ranking of S3 (CDFG 2010). The total area of Blue Palo Verde–Ironwood Woodland (Desert Dry Wash Woodland) within the proposed solar facility site is approximately 180 acres. There is a total of 179 acres of Blue Palo Verde–Ironwood Woodland (Desert Dry Wash Woodland) in the Alternative 5 site, and 98 acres in the Alternative 6 and Alternative 7 sites (Table 4.3-1 in Section 4.3). Each of the gen-tie line alternatives would pass through limited additional acreage of this woodland vegetation, ranging from 39 to 60 acres (see Table 4.3-2).

Disturbed Areas

There are small areas within the proposed solar facility site where natural vegetation has been removed or disturbed for roads and other land uses. In most cases (e.g., narrow roads), these areas are too small for mapping at this scale; however, the DHSP site overlaps a narrow area disturbed for date palm agriculture (on an adjacent parcel) in the southeastern corner of the site. This area is mapped as "Disturbed/Disused Agriculture" on Figure 3.3-1b in Appendix A. There are 2 acres of mapped Disturbed/Disused Agriculture within the proposed and alternative solar facility sites.

Creosote Bush Scrub (Sonoran Desert Scrub) on Partially Stabilized Sand Fields

Creosote Bush Scrub (Sonoran Desert Scrub) vegetation occurs on partially stabilized sand fields in the eastern portion of gen-tie Alternative E. This area is located at the western margin of a much larger dune system at the base of the Coxcomb Mountains. This vegetation matches the description of Creosote Bush Scrub (Sonoran Desert Scrub) above, but the cover is much sparser and the substrate consists of partially stabilized sand fields with accumulations of sands mounded at the bases of the shrubs. This habitat type is suitable for a series of special-status plants and animals, including Mojave fringe-toed lizard (*Uma scoparia*), which were reported in the area in the DSSF project EIS and observed there by Aspen biologists. None of this habitat is in the immediate vicinity of the proposed solar facility, and only gen-tie line Alternative E would traverse this habitat type.

Active Sand Dunes

Active sand dunes are found in the eastern portion of the project study area on gen-tie Alternative E. These dunes are at the western margin of the larger dune system described above. This habitat type is characterized by fine aeolian sands (i.e., dunes and sand flats) that support very little vegetation. Vegetation on the dunes is sparse, but dominated by scattered creosote bush and Russian thistle (*Salsola* sp.). Only gen-tie Alternative E would occur in the vicinity of these active sand dunes.

3.3.6 Invasive Plant Species

Invasive plants are non-native species that, upon becoming established in a new area, propagate and, ultimately, displace native species, supplant food plants or other habitat elements (e.g., cover) that are important to native wildlife species, alter natural habitat structure and ecological function, alter natural wildfire patterns, or displace special-status plant occurrences and habitat (Zouhar et al. 2008; Lovich and Bainbridge 1998). These plants are considered "weeds" or "pest plants" when they invade natural landscapes (Bossard et al. 2000). Weeds and pest plants are defined here to include any species of non-native plants identified on the weed lists of the California Department of Food and Agriculture, the California Invasive Plant Council, or of special concern identified by BLM.

Numerous invasive weeds have already become widespread throughout the Colorado Desert and for some invasive species the prevention of further spread is impracticable. Examples of these species include Mediterranean splitgrass (*Schismus barbatus*), Russian thistle (*Salsola tragus*), and Sahara mustard (*Brassica tournefortii*). Others (e.g., saltcedar: *Tamarix ramosissima*) are damaging to mesic habitat types but pose little or no threat to widespread upland desert habitat.

Within the project study area, the overall prevalence of invasive species is low, generally consistent with undisturbed desert bajadas and uplands throughout the region. Invasive plant species that have been found on the solar facility site and in the surrounding areas include Mediterranean splitgrass, red brome (*Bromus madritensis* ssp. *rubens*), crane's bill (*Erodium cicutarium*), Sahara mustard, London rocket (*Sisymbrium irio*), and Russian thistle. These and other species with potential of occurring on the site now or in the future are listed in Table 3.3-2. Species identified as having a high potential to occur were not identified on site during surveys, but based on their regional occurrence and potential for spread, would be likely to colonize portions of the project study area over time under baseline conditions. The potential for introduction and/or spread of invasive weeds from implementation of the DHSP is assessed in Section 4.3.

No distinct populations of any weed species were mapped in the DHSP study area, because weeds that are present on site are broadly distributed across the site in low to very low densities. There were no areas with weeds dense enough to map as a discrete occurrence, or extensive enough to meet the minimum vegetation mapping unit (approximately 0.15 acre [6,500 square feet]).

Table 3.3-2. Weeds of the Chuckwalla Valley

Weed Species	Rankings[1]	Habitats, Range, and Control Notes	Likelihood of Occurrence at DHSP
Alhagi pseudalhagi Camel thorn	CDFA: A Cal IPC: Moderate Impacts/Invasiveness/ Distribution: B/B/B	Widespread in California, many habitats, generally controlled by eradication efforts but new infestation sources are abundant in surrounding states	Currently low, but may be introduced via vehicles or other vectors from surrounding areas; potential to colonize and infest in periodically mesic places (e.g., evaporation pond margins, leaking tanks)
Avena spp. Wild oat	CDFA: n/a Cal IPC: Moderate Impacts/Invasiveness/ Distribution: B/B/A	Widespread and abundant in W Calif.; less common in deserts; new introductions are probably chronic in region; spread limited in low desert by soils and climate	High (generally in low numbers)
Brassica tournefortii Saharan mustard	CDFA: n/a Cal IPC: High Impacts/Invasiveness/ Distribution: A/A/B	Widespread and abundant in Calif. deserts; common in interior valleys (e.g., W Riverside Co.); especially invasive in open sands and in disturbed soils (including natural disturbance)	Occurs on the site and throughout the region
Brassica spp., Other non-native mustards	CDFA: n/a Cal IPC: Moderate-High Impacts/Invasiveness/ Distribution: vary by species	Widespread and abundant in W Calif.; less common in deserts; new introductions are probably chronic in region; spread limited in low desert by soils and climate	High (generally in low numbers)
Bromus madritensis ssp. *rubens* Red brome	CDFA: n/a Cal IPC: High Impacts/Invasiveness/ Distribution: A/B/A	Ubiquitous and often abundant or dominant throughout region and throughout most of Calif.	Occurs on the site and throughout the region
Bromus spp. Other non-native brome grasses	CDFA: n/a Cal IPC: Moderate-High Impacts/Invasiveness/ Distribution: vary by species	Widespread and abundant in W Calif. or at higher elev. or latitude in deserts; new introductions are probably chronic in region; spread limited in low desert by soils and climate	High (generally in low numbers)
Centaurea melitensis, C. solstitalis Annual star-thistles	CDFA: varies by species Cal IPC: Moderate-High Impacts/Invasiveness/ Distribution: B/B/B	Widespread and abundant in W Calif.; new introductions are probably chronic in region; spread may be limited in low desert by soils and climate	Moderate (periodic introductions are likely; potential for localized establishment in low density infestations)
Cynodon dactylon Bermuda grass	CDFA: C Cal IPC: Moderate Impacts/Invasiveness/ Distribution: B/B/B	Widespread and abundant in much of Calif.; new introductions are probably chronic in region; in deserts, requires mesic soil conditions	Moderate (periodic introductions are likely; potential for localized establishment in periodically mesic places such as evaporation pond margins, leaking tanks)
Erodium cicutarium Redstem filaree; crane's bill	CDFA: n/a Cal IPC: Limited Impacts/Invasiveness/ Distribution: C/C/A	Ubiquitous and often abundant or dominant throughout region and throughout most of S Calif.	Occurs on the site and throughout the region

Table 3.3-2. Weeds of the Chuckwalla Valley

Weed Species	Rankings[1]	Habitats, Range, and Control Notes	Likelihood of Occurrence at DHSP
Halogeton glomeratus Halogeton	CDFA: A Cal IPC: Moderate Impacts/Invasiveness/ Distribution: B/A/B	Widespread in arid regions of Calif and other western states; apparently spreading; to date, generally not invasive on well-drained bajada soils	Moderate (periodic introductions are likely; potential for localized establishment in periodically mesic places such as evaporation pond margins, leaking tanks)
Hirschfeldia geniculata Summer mustard; short-pod mustard	CDFA: n/a Cal IPC: Moderate Impacts/Invasiveness/ Distribution: B/B/A	Widespread and often abundant throughout much of Calif., including deserts;	High (not reported on site, but expected in surrounding area and likely to be introduced to the site)
Hordeum spp. Hare barley, Mediterranean barley	CDFA: n/a Cal IPC: Moderate Impacts/Invasiveness/ Distribution: B/B/A	Widespread and often abundant throughout much of Calif.; less invasive in well-drained desert bajadas	High (periodic introductions are likely; potential for localized establishment on roadsides or periodically mesic places such as evaporation pond margins, leaking tanks)
Pennisetum setaceum Fountain grass	CDFA: n/a Cal IPC: Moderate Impacts/Invasiveness/ Distribution: B/B/B	Widely planted as an ornamental, and spreading throughout S. Calif. in surrounding habitats	High (periodic introductions are likely; ongoing potential for establishment on the site)
Salsola spp. Russian thistle, tumbleweed	CDFA: C Cal IPC: Limited-Moderate Impacts/Invasiveness/ Distribution: varies by species	Widespread and often abundant throughout much of Calif.; including deserts	Occurs on the site and throughout the region
Schismus spp. Mediterranean grass, split grass	CDFA: C Cal IPC: Limited Impacts/Invasiveness/ Distribution: B/C/A	Widespread and often abundant throughout much of Calif.; including deserts	Occurs on the site and throughout the region
Sisymbrium irio London rocket	CDFA: n/a Cal IPC: Moderate Impacts/Invasiveness/ Distribution: B/B/A	Widespread and often common throughout much of Calif.; less common in deserts, mainly in seasonally slightly mesic or shaded sites	Occurs on the site and throughout the region; shaded areas and increased moisture (through dust control, etc.) likely to cause increased densities
Stipa capensis (=*Achnatherum capensis*) Cape ricegrass, various other common names	CDFA: n/a Cal IPC: Moderate Impacts/Invasiveness/ Distribution: B/B/D	Established in western Coachella Valley, apparently spreading rapidly in that area	High (periodic introductions are likely; ongoing potential for establishment on the site)
Tamarix spp. Tamarisk, saltcedar	CDFA: B Cal IPC: Limited-High Impacts/Invasiveness/ Distribution: varies by species	Widespread and strongly invasive in riparian habitats throughout California and southwestern desert regions	High (seed introductions likely to be constant; potential for establishment in periodically mesic places such as evaporation pond margins, leaking tanks
Tribulus terrestris Puncture vine	CDFA: C Cal IPC: n/a	Widespread, especially roadsides, disturbed sites, and agricultural lands	High (periodic introductions are likely; ongoing potential for establishment on the site)

1 – Explanation of Rankings:

California Department of Food and Agriculture Ratings (CDFA 2011):

A: Eradication, containment, rejection, or other holding action at the state-county level. Quarantine interceptions to be rejected or treated at any point in the state;

B: Eradication, containment, control or other holding action at the discretion of the commissioner;

C: State endorsed holding action and eradication only when found in nursery; action to retard spread outside of nurseries at the discretion of the commissioner—reject only when found in a crop seed for planting or at the discretion of the commissioner

Cal-IPC Ratings (Cal-IPC 2006):

High: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed.

Moderate: These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, although establishment is generally dependent on ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited: These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

3.3.7 Special-Status Plant Species

Table 3.3-3 presents the special-status plant species known from the region and summarizes their natural history, agency status, and probability of occurrence on the project site. See also Figure 3 of the BRTR (Appendix C.6 of this EIS), which depicts documented occurrences of special-status plant species that are known from the vicinity. No BLM Sensitive Species or CRPR 1B species are known from the project study area. The potential for occurrence is assessed based on the following criteria:

- **Present:** The taxon was observed within the project study area during surveys or has been documented in the project study area. (*Taxon* [plural, *taxa*] refers to a specific taxonomic entity, such as a species, subspecies, or variety).
- **High:** The taxon has been documented within the project vicinity (5 miles) and suitable environmental conditions such as soil type are found within the project area; but the taxon was not detected during project-specific biological surveys.
- **Moderate:** Either the taxon has been documented within the project vicinity (5 miles), or suitable environmental conditions such as soil type are found within the project area, and the project site is within its known geographic range.
- **Low:** There are no records of the taxon within the project vicinity (5 miles), the environmental conditions are marginal, and/or the taxon is conspicuous and was not detected during biological surveys.
- **Not Likely to Occur:** No known records exist and the project study area lacks suitable habitat requirements (including soil and elevation factors).

Table 3.3-3. Special-Status Plants Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat and Distribution	Blooming Period	Potential to Occur
Abronia villosa var. *aurita* Chaparral sand-verbena	Federal – None State – None BLM – Sensitive CRPR – 1B.1	Annual or perennial herb; sand, about 250–5300 ft elev; San Jacinto Mts, Inland Empire, adjacent Colorado Desert, Orange & San Diego Counties; mostly alluvial fans and benches in W Riverside Co; dunes in deserts; not rare in the deserts	Feb–Jul	Low on most project components. Large washes or roadsides provide potential habitat; otherwise not expected to occur. High in aeolian sand along Alternative E.
Ammoselinium giganteum Desert sand-parsley	Federal – None State – None BLM – None CRPR – 2.3	Annual; only known Calif location at Hayfields Dry Lake, about 1300 ft elev; heavy soils, beneath shrubs; also to Arizona and mainland N Mexico	Mar–Apr	Not Likely to Occur. No suitable dry lakebed habitat is present.
Androstephium breviflorum Pink funnel-lily, small-flowered androstephium	Federal – None State – None BLM – None CRPR – 2.3	Bulb; Mojave Desert shrub-lands; stabilized dunes or sandfields, about 700-5300 ft elev; scattered in Calif, N Arizona, S Nevada, to W Colorado	Mar–Apr	Not Likely to Occur on most project components. No suitable habitat is present on the solar field site or gen-tie Alternatives B, C, or D. Low in aeolian sand along Alternative E.
Astragalus insularis var. *harwoodii* Harwood's milk-vetch	Federal – None State – None BLM – NECO CRPR – 2.2	Annual; sand, mainly dunes, also washes and slopes; below about 1200 ft elev; SE Calif to Arizona, Baja and Sonora	Jan–May	Low on most project components. Large washes or roadsides provide potential habitat; otherwise not expected to occur. Moderate to high in aeolian sand along Alternative E.
Astragalus lentiginosus var. *coachellae* Coachella Valley milk-vetch	Federal – Endangered State – None BLM – Sensitive, NECO CRPR – 1B.2	Annual or perennial herb; open sand, generally dunes but also wash margins; below about 2200 ft elev; endemic to Coachella Valley; formerly reported from Chuckwalla Valley, those populations now recognized as *A. l.* var. *variabilis* (speckled milk-vetch)	Feb–May	Not Likely to Occur. Outside geographic range.
Ayenia compacta Ayenia	Federal – None State – None BLM – None CRPR – 2.3	Perennial herb; desert shrub-land, generally rocky sites, washes and mountain slopes below about 3600 ft elev; W low desert margins, Chuckwalla Valley, and E Mojave; also Baja and Sonora (Mexico)	Mar–Apr	Low-moderate. Large washes are marginally suitable; not seen during field surveys.
Cassia – see *Senna*				

Table 3.3-3. Special-Status Plants Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat and Distribution	Blooming Period	Potential to Occur
Castela emoryi Crucifixion thorn	Federal – None State – None BLM – NECO CRPR – 2.3	Shrub; widespread but rare, Calif deserts to Arizona, Baja, and Sonora; fine sand or silt, washes, plains, non-saline bottomlands, about 350-2100 ft elev	Jun–Jul	Present. See Figure 3.3-1 in Appendix A.
Chamaesyce abramsiana (=*Euphorbia abramsiana*) Abrams' spurge	Federal – None State – None BLM – None CRPR – 2.2	Annual; sandy flats; about sea level to 3,000 ft elev; East Mojave desert, Joshua Tree NP, and low desert, to Arizona and Mexico	Sep–Nov	Low on most project components. Large washes or roadsides provide potential habitat; otherwise not expected to occur. High on aeolian sand along gen-tie Alt E.
Colubrina californica Las Animas colubrina	Federal – None State – None BLM – NECO CRPR – 2.3	Shrub; scattered mountain ranges of the low desert, incl Joshua Tree NP, Eagle Mts, Chuckwalla Mts, etc.; about 1100-3900 ft elev; rare in Calif, more common in Arizona and Mexico	Apr–May	Low. Conspicuous shrub, not found during field surveys.
Coryphantha alversonii (=*C. vivipara* var. *alversonii*; *Escobaria vivipara* var. *alversonii*) Alverson's foxtail cactus	Federal – None State – None BLM – NECO CRPR – 4.3	Cactus; desert scrub, S Mojave and Sonoran Deserts, about 250-5000 ft elev; Riverside, San Bernardino, and Imperial Counties to Arizona	May–Jun	Low-moderate. Bajada sites are marginally suitable; not seen during field surveys.
Cryptantha costata Ribbed cryptantha	Federal – None State – None BLM – None CRPR – 4.3	Annual; windblown and stabilized sand, desert shrublands; E Mojave and Sonoran Deserts, to Arizona & Baja; below sea level to about 1650 ft. elev.	Feb-May	Low on most project components. Large washes or roadsides provide potential habitat; otherwise not expected to occur. Present in dunes along Alternative E.
Cynanchum utahense (=*Funastrum utahense*) Utah vine milkweed	Federal – None State – None BLM – None CRPR – 4.2	Climbing perennial herb; sandy or gravelly soils, E and S Mojave Des through JTNP and Anza-Borrego regions, to S Nevada, NW Arizona, and SW Utah; about 500–4700 ft elev	Apr –Jun	Present. See Figure 3.3-1 in Appendix A.
Ditaxis claryana (=*D. adenophora*) Glandular ditaxis	Federal – None State – None BLM – NECO CRPR – 2.2	Perennial herb. Conflicting info in literature. Sandy soils below about 350 ft elev; or rocky uplands & sandy washes to 3000 ft; widely scattered, Sonoran Desert, Calif to Arizona and mainland Mexico	Spring or fall (based on rains)	Moderate. Habitat may be suitable, but not seen during field surveys.

Table 3.3-3. Special-Status Plants Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat and Distribution	Blooming Period	Potential to Occur
Ditaxis californica (=*D. serrata* var. *californica*) California ditaxis	Federal – None State – None BLM – NECO CRPR – 3.2	Perennial herb; washes and canyons, low desert and adjacent mountains; La Quinta E to Desert Center, also Anza Borrego; about 100–3250 ft elev	Mar–Dec	Moderate. Habitat is suitable, but not seen during field surveys.
Eriastrum harwoodii Harwood's woollystar	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Annual; partially stabilized desert dunes (San Bernardino, Riverside, and San Diego Counties); about 900–1700 ft elev	Mar–Jun	Low on most project components. Large washes or roadsides provide potential habitat; otherwise not expected to occur. Present on gen-tie Alt E (see revised Figure 3.3-1b in Appendix A).
Escobaria – see *Coryphantha*				
Euphorbia – see *Chamaesyce*				
Grusonia parishii (=*Opuntia parishii*) Parish's club-cholla	Federal – None State – None BLM – None CRPR – 2.2	Stem-succulent; rocky desert shrublands, East Mojave Desert, Joshua Tree NP, foothills above Coachella and Chuckwalla valleys; about 1000–5000 ft elev	May–Jul	Low-moderate. Bajada sites are marginally suitable; not seen during field surveys.
Koeberlinia spinosa var. *tenuispina* Slender-spined all-thorn	Federal – None State – None BLM – NECO CRPR – 2.2	Deciduous shrub; desert shrublands and washes, below about 1700 ft elev; central Sonoran Desert, Imperial and Riverside Counties; reported on-site in CNDDB, apparently based on misidentified *Castela emoryi*	May–Jul	Low. Not seen during field surveys; see text
Matelea parvifolia Spearleaf	Federal – None State – None BLM – NECO CRPR – 2.3	Low twining vine; rocky sites in desert shrublands, central and eastern deserts and Anza-Borrego State Park; S Nevada, Texas, and Baja; about 1400–3600 ft elev	Mar–May	Moderate. Habitat may be suitable, but not seen during field surveys.
Opuntia – also see *Grusonia*				
Opuntia wigginsi Wiggins cholla	Federal – None State – None BLM – NECO CRPR – 3.3	Cactus; doubtful taxon; probably a hybrid (*O. ramisissima* x *echinocarpa*), desert shrubland about 100-3000 ft elev, scattered Colorado Desert sites, east to Arizona	Mar	Low. Conspicuous plants, not seen during field surveys
Proboscidea althaefolia Desert unicorn-plant	Federal – None State – None BLM – NECO CRPR – 4.3	Perennial herb; generally sandy soils, desert shrubland, about 500–3300 ft elev; Sonoran Desert to Arizona and Mexico	May–Aug	Present. See Figure 3.3-1 in Appendix A

Table 3.3-3. Special-Status Plants Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat and Distribution	Blooming Period	Potential to Occur
Salvia greatae Orocopia sage	Federal – None State – None BLM – Sensitive, NECO CRPR – 1B.3	Shrub; desert shrubland, washes and alluvial fans, about 100–2800 ft elev; Riverside & Imperial Counties, endemic to Orocopia Mts and Chocolate Mts (doubtful report near Cadiz, San Bernardino County)	Mar–Apr	Low. Habitat may be suitable, but not seen during field surveys and outside documented geographic range.
Selaginella eremophila Desert spike-moss	Federal – None State – None BLM – None CRPR – 2.2	Perennial herb; mountainous or hillside rock outcrops and crevices, about 600–3000 ft elev; lower desert-facing slopes of San Jacintos and adjacent desert, to Texas and Baja	n/a	Not Likely to Occur. No suitable habitat is present.
Senna covesii (=*Cassia covesii*) Coves's cassia	Federal – None State – None BLM – NECO CRPR – 2.2	Low, mostly herbaceous perennial; desert washes below about 2000 ft elev; Colorado Desert to Nevada, Arizona and Baja. [ranked S1 in CDFG 2011, corrected as S2 by pers. comm. with R. Bittman, CDFG, 21 Sep 2011]	Apr–Jun	Moderate. Habitat may be suitable, but not seen during field surveys
Stylocline sonorensis Mesquite nest straw	Federal – None State – None BLM – NECO CRPR – 1A	Annual; known from only one record, near Hayfields Dry Lake, now presumed extirpated; occurs in SE Arizona and mainland Mexico	Apr	Not Likely to Occur. Apparently extirpated from California.
Teucrium cubense ssp. *depressum* Dwarf germander	Federal – None State – None BLM – None CRPR – 2.2	Annual or perennial herb; sandy alluvium, washes, etc., below about 1300 ft elev, scattered Sonoran Desert locations, to Texas and Baja	Mar–May	Moderate. Habitat may be suitable, but not seen during field surveys
Wislizenia refracta ssp. *palmeri* Jackass-clover	Federal – None State – None BLM – NECO CRPR – 2.2	Perennial herb or subshrub; sand flats, washes, road-sides, saltbush scrub; scat-tered Calif desert locations eastward to New Mexico, sea level to about 1000 ft elev	Apr–Nov	Low on most project components. Large washes or roadsides provide potential habitat; otherwise not expected to occur. High in aeolian sand on gen-tie Alt E.

Table 3.3-3. Special-Status Plants Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat and Distribution	Blooming Period	Potential to Occur

California Rare Plant Rank (CRPR):
1A. – Presumed extinct in California
1B. – Rare or endangered in California and elsewhere
2. – Rare or endangered in California, more common elsewhere
3. – Plants for which more information is needed (Review list)
4. – Plants of limited distribution (Watch List)
Threat Rank Extension:
0.1 = Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 = Fairly endangered in California (20-80% occurrences threatened)
0.3 = Not very endangered in California (<20% of occurrences threatened or no current threats known)

BLM Sensitive = Species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. BLM Sensitive species also include all federal Candidate species and federal Delisted species which were so designated within the last 5 years, and CRPR 1B plant species that occur on BLM lands.

NECO = Special-status species that were addressed in the NECO Plan/EIS due to management concerns within the NECO Planning Area.

Source: CNPS 2011; CDFG 2011.

Listed Threatened or Endangered Species

This section describes species reported from the region that are listed as threatened or endangered under the CESA or ESA. One listed threatened or endangered plant, Coachella Valley milk-vetch, has been reported in the Chuckwalla Valley, though that report is now discounted (see below). Other listed threatened or endangered species of the low desert region (e.g., triple-ribbed milk-vetch, Peirson's milk-vetch) occur well outside the area and are not addressed in this report. No listed threatened or endangered plant species, or species proposed for listing or candidates for listing, have been documented on site of the proposed project or alternatives.

Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae)*: Coachella Valley milk-vetch is an annual or short-lived perennial endemic to the Coachella Valley. It is primarily found on loose aeolian or, less often, in alluvial sands, on dunes or flats and along disturbed margins of sandy washes. The easternmost known occurrences are near Indio, about 40 miles west of the project study area. All designated critical habitat for Coachella Valley milk-vetch is within the Coachella Valley, west of Indio (USFWS 2011). Specimens resembling Coachella Valley milk-vetch have been collected from the Pinto Wash and Palen dune system, northeast of Desert Center. However, the USFWS (2009; 2011) regards these as the related species, speckled milk-vetch (*A. lentiginosus* var. *variabilis*), which has no special conservation status. The only portion of the proposed project or alternatives that would affect suitable habitat for Coachella Valley milk-vetch would be gen-tie Alternative E, which would cross some areas of dunes and partially stabilized aeolian sand habitat. Speckled milk-vetch, a different species, occurs on the Alternative E alignment (Appendix C.16, [BRTR Supplement]). However, because the project study area is well outside the recognized geographic range, Coachella Valley milk-vetch is not expected to occur in the project area.

BLM Sensitive Plant Species

The BLM (2010b) maintains a list of species designated as Sensitive, including species that are rare, declining, or dependent on specialized habitats. The list includes all plants ranked by CNPS and CDFG as CRPR 1. The BLM manages sensitive species to provide protections comparable to species that may become listed as threatened or endangered (i.e., candidate species for federal

listing). None of these species has been documented on the site of the proposed project or alternatives. Each BLM sensitive plant species known from the project study area is described briefly, below.

Chaparral sand-verbena (*Abronia villosa* var. *aurita*): Chaparral sand-verbena's distribution and identification are unclear in published reference works, including Spellenberg (2002), CNPS (2011) and CNDDB (2011). This plant was added to the CNPS Inventory based on recommendations by Andrew C. Sanders of the UC Riverside Herbarium. The primary conservation concern is for chaparral sand-verbena occurrences in western Riverside County and other locations outside the desert (see Roberts et al. 2004). These western plants appear to be distinct from the very common desert sand verbena, *Abronia villosa* var. *villosa*. Plants in the low desert often match the characteristics of the western Riverside County populations, but do not appear to be regionally rare. There is some possibility that habitat adjacent to the solar facility site may support chaparral sand-verbena, especially along the access road margins near Highway 95. On gen-tie alignment Alternative E, there is a high probability that chaparral sand verbena could be found in sandy areas, particularly dunes and partially stabilized aeolian sand, along the alignment. It also could occur, with lower probability, along road or wash margins on the alignment.

Harwood's woolly-star (*Eriastrum harwoodii*): Harwood's woolly-star is an annual species known only from partially stabilized aeolian sand habitats in the deserts of eastern Riverside and San Bernardino counties (Gowen 2008) and San Diego County (DeGroot 2008). It flowers in early April. Harwood's woolly-star was documented at multiple locations along portions of gen-tie alignment Alternative E crossing dunes and partially stabilized sand (see Figure 4 of Appendix C.16. [BRTR Supplement]). Because it is an annual plant, Harwood's woolly-star plants could be found in future years in other locations within the dunes or partially stabilized sand portions of the alignment.

Orocopia sage (*Salvia greatae*): Orocopia sage is a shrubby sage with spiny leaves and lavender flowers. It is endemic to the Orocopia and Chocolate Mountains, Riverside County, where it occurs in desert washes below about 2800 feet elevation. It also has been reported from the Mojave Desert in San Bernardino County, though that report almost certainly refers to a misidentification of Death Valley sage (*S. funerea*) (A. Sanders, UC Riverside, pers. comm.). Habitat on the proposed solar facility site, gen-tie alignment, and alternative alignments appears to be suitable, but the project area is a few miles north of its known geographic range. It has not been located on the site during field surveys, but there is a low probability that it may occur on the site.

Mesquite neststraw (*Stylocline sonorensis*): Mesquite neststraw is known from southeastern Arizona and northeastern Sonora, Mexico. It has only been documented at one California location, near Hayfields Dry Lake, where it was collected in the 1930s. It is now presumed extirpated in California. Its habitat is reported as "grassy hillsides, sandy drainages, with mesquite" (Morefield 2006). The only potential habitat in the project study area is along gen-tie alignment Alternative E, on valley floor drainages. Mesquite neststraw was not located during field surveys of gen-tie alignment Alternative E and is not expected to occur in the project study area due to its apparent extirpation in California.

Other Special-Status Plant Species

In addition to the statutes and policies described above, several public agencies and private entities maintain lists of plants and animals of conservation concern. The CDFG compiles these in its compendia of "Special Plants." These plants are treated here as "special-status species." All plants of the region that are identified as CRPR 2, 3, or 4 are included in Table 3.3-3, but only those species reported from the proposed solar facility site and/or gen-tie alternatives are addressed below.

Crucifixion thorn (*Castela emoryi*): Crucifixion thorn is endemic to the Sonoran and southern Mojave Deserts of the American southwest. It is widely scattered in southwestern Arizona; its scattered occurrences in the California deserts are the western extent of its range (Turner et al. 1995). The most well-known stand is at the Crucifixion Thorn Natural Area (CTNA) in Imperial County, California. It also occurs at a few sites in northwestern Sonora, Mexico, and in northern Baja California immediately adjacent to the CTNA. Crucifixion thorn is a leafless shrub or small tree of washes, non-saline dry lakes, and other sites where water accumulates. The plants are long-lived and densely thorny. The stems are light gray-green, rigid, ascending (directed upward) with stout spine-tipped twigs. Its flowers are inconspicuous and abundant. The fruits, after maturing, remain on the plant for several years. Young plants, prior to fruiting, do not have the characteristic clustered fruits of older plants. Plants occur as scattered colonies, possibly clones, of fairly small size that do not extend far across the landscape (Shreve and Wiggins 1964). Emory's crucifixion thorn is assigned to CRPR 2.3 (rare, threatened, or endangered in California, but more common elsewhere). It is not managed by BLM as a sensitive species (BLM 2010b).

Three individual crucifixion thorn plants were located along the western boundary of the larger, northeastern solar facility parcel, and numerous additional plants were located in the smaller, southwestern parcel (Figure 3.3-1a in Appendix A). Large stands of crucifixion thorn are described as "crucifixion thorn scrub" (Sawyer et al. 2009), but the density and extent of the plants on the proposed solar facility site do not warrant mapping as a distinct vegetation type.

Utah vine milkweed (*Cynanchum utahense* [=*Funastrum utahense*]): Utah vine milkweed is a perennial herb that dies back to the ground in summer. It ranges from the California deserts to southwestern Utah. Its habitat is desert washes and canyons (Bell 2009). It was recorded on the proposed solar facility site during 2010 spring botanical surveys (see the BRTR, Appendix C.6 and C16), but was not identified in subsequent surveys. Aspen botanists located a single Utah vine milkweed a short distance outside the solar facility site while visiting a reference location of slender-spined all-thorn (below). Utah vine milkweed is assigned to CRPR 4.2 (limited distribution, "watch list"). It is not managed by BLM as a sensitive species (BLM 2010b).

Slender-spined all-thorn (*Koeberlinia spinosa* var. *tenuispina*): Slender-spined all-thorn is a densely branched shrub, to several meters tall, with dark green bark (Turner et al. 1995). Most verified California locations are within the Chocolate Mountains, a few miles south of the proposed project and alternatives, but it was also identified on the DSSF project site, north of the proposed solar facility site. It resembles crucifixion thorn (above), and is distinguished by stems, which are brighter green, not as stout, and branched at right angles rather than ascending. It does not retain fruits on the stems after maturation. The CNDDB reported a slender-spined all-thorn occurrence in the smaller, southwest portion of the proposed solar facility site, but Aspen botanists located that plant and determined that it was a young crucifixion thorn, without fruits

on the stem. Based on field survey results, slender-spined all-thorn is not likely to occur on the proposed solar facility site.

Desert unicorn-plant (*Proboscidea althaefolia*): Desert unicorn-plant, also called "devil's claw," is a perennial herb that grows from a large roost stock. It is dormant in spring, but sprouts in response to warm season rains. It ranges throughout much of the Sonoran Desert, eastward to Texas and parts of mainland Mexico. It is conspicuous for its woody, hook-shaped fruits (pods), that are evidently dispersed by clinging to fur or hooves of large mammals. Desert unicorn-plant was located at several sites on the proposed solar facility site and along gen-tie Alternative E during fall 2011, but not fall 2010. It is ranked as CRPR 4.3.

Ribbed cryptantha (*Cryptantha costata*): Ribbed cryptantha is an annual species found on windblown and stabilized sands, in the eastern Mojave and Sonoran Deserts in California, eastward into Arizona and south into Baja California. It flowers in spring. It is ranked as CRPR 4.3 (limited distribution, "watch list"). It is not managed by BLM as a sensitive species (BLM 2010a). It occurs throughout the dune habitat along gen-tie alignment alternative E (see Figure 4 of Appendix C.16. [BRTR Supplement]). In addition to these dunes, small patches of marginal habitat are present throughout the project study area on roadsides, washes, and other sandy areas. However, it has not been located on the proposed solar facility site or on gen-tie alignment Alternatives B, C, or D. Because it is an annual plant, ribbed crypantha plants could be found in future years in other locations within the dunes or partially stabilized sand portions of the alignment.

Native Cacti

Five species of cacti were found on the solar facility site and gen-tie alternatives, and are listed below. None of these species are considered special status (above), and all were relatively scarce. The BLM generally directs salvage and translocation of cacti and yucca species.

- California barrel cactus (*Ferocactus cylindraceus*)
- Fish-hook cactus (*Mamillaria tetrancistra*)
- Beavertail cactus (*Opuntia basilaris* var. *basilaris*)
- Silver cholla (*Cylindropuntia echinocarpa*)
- Pencil cholla (*Cylindropuntia ramosissima*)

3.3.8 Sensitive Natural Communities

Blue Palo Verde–Ironwood Woodland (Desert Dry Wash Woodland)

The NECO Plan/EIS designates desert dry wash woodland habitats (including Blue Palo Verde–Ironwood Woodland) as a sensitive habitat subject to 3:1 mitigation for any disturbance within that habitat. There are approximately 180 acres of this woodland habitat within the proposed solar facility site, and similar woodlands are present along portions of each gen-tie alternative (Section 3.3.5, above, and Figure 3.3-1 in Appendix A). In addition, Desert Dry Wash Woodland is present off-site, along episodic stream channels both upstream and downstream from the solar facility boundaries, and in Pinto Wash, east of the solar facility site.

Aeolian Sand Habitats, Including Active Dunes and Stabilized Sand Fields

Vegetation and habitat mapped as Active Sand Dunes and Creosote Bush Scrub (Sonoran Desert Scrub) on Partially Stabilized Sand Fields (Figure 3.3-1 in Appendix A) provide suitable habitat for several special-status plants and animals, including Harwood's milk-vetch, Harwood's woolly-star, and Mojave fringe-toed lizard. These habitats are found along portions of gen-tie Alternative E, but not on the proposed solar facility site or the other gen-tie alignment alternatives.

3.3.9 Jurisdictional Resources

Episodic or ephemeral washes are present throughout the proposed solar facility site and the gen-tie alternatives. These washes rarely carry surface flow, except during rainstorms, or during floods originating from heavy precipitation higher in the watershed. Typical regional storms generally occur during winter, are of low intensity, but can create short-lived surface flow and cause flooding on playa lake beds. Intense storms during winter or localized summer thunderstorms can produce heavier flooding. During heavy storms, runoff is characteristically by sheet-flow over the entire bajada surface, subsiding to flow within the drainages. Depending on intensity and sediment load, these events may rework sediments and channels, depositing new sediment or scouring and cutting channels. The entire system of narrow, ephemeral channels and the broader active alluvial fan and bajada surface is considered an episodic stream system.

The episodic system in the upper Chuckwalla Valley is within the closed Palen Dry Lake drainage basin. Due to the absence of a surface water connection to a traditional navigable waterway, or other jurisdictional criteria, stream channels in the area do not fall within jurisdiction of the USACE as defined by Section 404 of the federal Clean Water Act. The jurisdictional delineation (see Section 3.3.3 for methodology and Appendix C.11 for the report and USACE concurrence) shows that ephemeral desert dry washes mapped within the DHSP are non-jurisdictional under Section 404 of the Clean Water Act (Figure 3.3-3, Attachment 2), and there are no wetlands meeting the criteria of the 1987 USACE Wetland Delineation Manual and the 2008 USACE Arid West Region Supplement (Version 2.0). On May 29, 2012, the United States Army Corps of Engineers, Los Angeles District, concurred with this determination that no Waters of the United States are present at the solar facility site or gen-tie alternative alignments (see Appendix C.11). The waters on site are classified as non-wetland State waters.

The USFWS National Wetlands Inventory (NWI) designates one area within the proposed solar facility site as a riverine intermittently flooded unconsolidated streambed wetland. The NWI uses the Cowardin et al 1979 definition of wetlands, which states that, generally, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface (EPA 2012, USFWS 2004). Wetlands are defined under the federal Clean Water Act as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions." According to the USACE Delineation Manual (1987) and the Arid West Supplement (2008), a site must meet three parameters to meet wetlands criteria: soils, vegetation and hydrology. NWI wetland maps were created at a smaller scale than that at which project surveys were conducted and were largely created through the use of aerial imagery. As stated by the USFWS, "A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image

analysis" (USFWS 2012). Project-specific surveys, which provide a much more fine-grained examination of potential wetland areas, identified this NWI wetland area at the project site as a major ephemeral wash and not a wetland according to any of the above criteria.

The CDFG regulates alterations to state-jurisdictional streambeds under Section 1600 et seq. of the California Fish and Game Code. Jurisdictional acreage is interpreted as the bed and banks of channels and adjacent riparian vegetation. In the Chuckwalla Valley area, the Blue Palo Verde – Ironwood Woodland (or Desert Dry Wash Woodland, described above) is the regional riparian vegetation type. Due to the abundance and close spacing of braided channels throughout the area, all mapped Blue Palo Verde–Ironwood Woodland (Desert Dry Wash Woodland) is adjacent to one or more channels (see Figures 3.3-1a and 3.3-2). The total acreage of state-jurisdictional streambeds and adjacent riparian habitat is 258.5 acres within the proposed solar facility site. Each of the gen-tie alternatives would pass through additional acreage of state-jurisdictional woodland vegetation (see Table 4.3-2).

3.4 BIOLOGICAL RESOURCES – WILDLIFE

This section describes the environmental and regulatory settings associated with the construction and operation of the proposed project and its alternatives with respect to wildlife resources in the project study area. The project study area for wildlife resources includes the portion of the Chuckwalla Valley and surrounding mountains within a 5-mile radius of the proposed project and alternatives, as this is the limit of the area likely to be affected by the Desert Harvest Solar Project (DHSP) with respect to most wildlife resources. For wildlife movement, the study area is larger, because it extends south of Interstate 10 and encompasses the entire Chuckwalla Valley and parts of Joshua Tree National Park.

3.4.1 Applicable Plans, Policies, and Regulations

Federal Regulations

Section 3.3.1 (Vegetation) provides descriptions of the following federal statutes and regulations that are also applicable to this Section:

- Endangered Species Act of 1973
- California Desert Protection Act of 1994
- Lacey Act, as amended (16 USC 3371-3378)
- Executive Order 13112 – Invasive Species
- Executive Order 13212 – Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use
- Fish and Wildlife Coordination Act

In addition to the applicable federal regulations described in Section 3.3.1, the following federal regulations apply to this analysis of wildlife resources:

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703-711) is a treaty signed by the United States, Canada, Mexico, and Japan that prohibits take of any migratory bird, including eggs or active nests, except as permitted by regulation (e.g., hunting waterfowl or upland game species). Under the MBTA, "migratory bird" is broadly defined as "any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle" and thus applies to most native bird species.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 (BGEPA) (16 USC, 668, enacted by 54 Stat. 250) protects bald and golden eagles by prohibiting the taking, possession, and commerce of such birds and establishes civil penalties for violation of this act. The BGEPA defines 'take' to include "pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, and disturbing." The USFWS (2007) further defines 'disturb' as "to agitate or bother a bald eagle or a golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior,

or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

The USFWS (2009) can authorize take of bald and golden eagles according to specific regulations. Authorized take must be associated with, but not the purpose of, an otherwise lawful activity, and cannot practicably be avoided (50 CFR § 22.26).

Desert Tortoise Recovery Plan and Critical Habitat Designation of 1994, Revised 2011

The Desert Tortoise Recovery Plan of 1994 established a strategy for the recovery and eventual delisting of the Mojave population of desert tortoise. The strategy included the identification of 6 recovery units, recommendations for a system of Desert Wildlife Management Areas (DWMAs) within the recovery units, and development and implementation of specific recovery actions, especially within DWMAs. Maintaining high survivorship of adult desert tortoises was identified as the key factor in recovery (USFWS 2011a).

The Revised Recovery Plan for the Mojave Population of the Desert Tortoise (Revised Plan) was published in May 2011 (USFWS 2011a), which re-delineated the recovery units and reduced them from 6 units to 5, based on recent genetic research and identification of geographic discontinuities or barriers that coincide with observed variation among tortoise populations. Differences in genetic, ecological, and physiological characteristics were used to help highlight boundaries or other differences among units. The recovery units cover the entire range of the Mojave desert tortoise population (all tortoises north and west of the Colorado River). The Revised Plan also includes consideration of alternative energy development, as a number of projects have been, and continue to be, proposed and developed in the range of the desert tortoise in recent years. Implementation of a number of the recommended Recovery Actions identified within the Revised Plan would make progress towards reducing threats associated with energy development. Still, the Revised Plan does not provide a single, comprehensive strategy for addressing renewable energy. To more comprehensively address this threat, the USFWS will soon add a renewable energy chapter to the Revised Plan that will act as a blueprint to allow the USFWS and its partners to comprehensively address renewable energy development and its relationship to desert tortoise recovery (USFWS 2011a).

State Laws and Regulations

Section 3.3.1 provides descriptions of the following state laws and regulations:

- California Environmental Quality Act
- California Natural Community Conservation Planning Act

In addition to the applicable state regulations described in Section 3.3.1, the following state regulations apply to this analysis of wildlife resources:

California Endangered Species Act

The California Endangered Species Act (CESA) (Fish and Game Code 2050 *et seq.)* establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that state agencies should not approve projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. There are no state agency consultation pro-

cedures under CESA. For projects that affect a species listed under both CESA and the federal ESA, compliance with the federal ESA will satisfy CESA if CDFG determines that the federal incidental take authorization is consistent with CESA under Fish and Game Code Section 2080.1. For projects that will result in take of a species listed under CESA but not under the federal ESA, the applicant must apply for a take permit under Section 2081(b). Species seen in the project study area that are listed under the CESA but not the federal ESA include the Gila woodpecker (*Melanerpes uropygialis*) and Swainson's hawk (*Buteo swainsonii*).

Fully Protected Designations – California Fish and Game Code Sections 3511, 4700, 5515, and 5050

Prior to enactment of CESA and the federal ESA, California enacted laws to "fully protect" designated wildlife species from take, including hunting, harvesting, and other activities. Unlike the subsequent CESA and ESA, there was no provision for authorized take of designated fully protected species. Currently, 36 fish and wildlife species are designated as fully protected in California, including golden eagle.

California Senate Bill 618 (signed by Governor Brown in October 2011) authorizes take of fully protected species, where pursuant to an NCCP, approved by CDFG. The legislation gives fully protected species the same level of protection as is provided under the Natural Community Conservation Planning Act for endangered and threatened species (see Section 3.3.1).

Native Birds – California Fish and Game Code, Sections 3503 and 3513

California Fish and Game Code Section 3503 prohibits take, possession, or needless destruction of bird nests or eggs except as otherwise provided by the Code; Section 3503.5 prohibits take or possession of birds of prey or their eggs except as otherwise provided by the Code; and Section 3513 provides for the adoption of the MBTA's provisions (above). With the exception of a few non-native birds such as European starling, the take of any birds or loss of active bird nests or young is regulated by these statutes. Most of these species have no other special conservation status as defined above. The administering agency for these sections is the CDFG.

Protected Furbearers–- California Code of Regulations Title 14 Section 460

The California Code of Regulations states that "[f]isher, marten, river otter, desert kit fox and red fox may not be taken at any time." Based on the California Fish and Game Code definition of "take," which is reaffirmed in applicable game and furbearer regulations (CCR Section 255), the CDFG does not issue Incidental Take Permits or Memoranda of Understanding to permit the capture or handling of desert kit fox.

Bureau of Land Management Plans and Guidelines

The BLM CDCA Plan, NECO Plan, and Sensitive Species lists are described in Section 3.3.1. Further description of the CDCA and NECO Plans, below, addresses wildlife provisions of those plans.

California Desert Conservation Area Plan: Wildlife Element

The Wildlife Element of the CDCA Plan contains objectives and goals designed to: manage federally and State listed species and their habitats; comply with existing legislation and BLM poli-

cies; provide certain species designated as sensitive by the BLM special consideration and attention in the planning process; consider the habitat of all fish and wildlife in implementing the CDCA Plan; manage representative habitats using a holistic approach; give habitats unique to the CDCA special management consideration and manage them so as to maintain their unique biological characteristics; and manage sensitive habitat using a holistic, systems-type approach. Some examples of sensitive habitats include: riparian areas, wetlands, sand dunes, relict and island habitats, washes, and important ecological zones between different major ecosystems and deserts.

The primary active wildlife management tools used in the CDCA Plan are Areas of Critical Environmental Concern (ACECs) and Habitat Management Plans (HMPs). The plan also includes a designation of Special Areas that highlights habitats and species that should receive special consideration in the environmental assessment process for all project types. Two additional designations in the Wildlife Element are Research Natural Area and Sikes Act Agreement. Research Natural Areas have been proposed in a few locations where research and education would be the primary uses. Sikes Act Agreements are cooperative agreements between the BLM and the CDFG for joint development and implementation of an HMP. The plan identified 89 special fish and wildlife areas that would receive active habitat management and/or special attention in the environmental assessment process. Twenty-eight areas were identified as ACECs solely or partially to protect fish and wildlife resources.

Northern and Eastern Colorado Desert Coordinated Management Plan/EIS

The NECO Plan/EIS provides reserve management for the desert tortoise, integrated ecosystem management for special status species and natural communities for all federal lands, and regional standards for public land health for BLM lands. The NECO Plan focuses on the conservation of species and habitats through the use of a system of large DWMAs for the desert tortoise and WHMAs for other special status species and natural communities. DWMAs and WHMAs would replace all current special designations for species and habitats. DWMAs generally coincide with current tortoise critical habitat areas, are ACECs, and feature a one percent surface disturbance limit. The focus of WHMAs is on mitigation, habitat improvements, and federal ownership. The NECO Plan/EIS also addresses designation of routes of travel, land ownership pattern, access to resources for economic/social needs, bighorn sheep management, and wild horse and burro management.

Within the project study area, there occur both a DWMA and a WHMA. The Chuckwalla DWMA is immediately west of the proposed solar facility, and covers thousands of acres in the Chuckwalla Valley. The Palen-Ford WHMA is located east and northeast of the solar facility and it overlaps slightly into the proposed solar facility boundaries.

Regional and Local Regulations

County of Riverside General Plan

The following open space policies relevant to wildlife are defined in the Desert Center Area Plan (DCAP) within the Riverside County General Plan as follows:

DCAP 10.1 Encourage clustering of development for the preservation of contiguous open space.

DCAP 10.2 Work to limit off-road vehicle use within the Desert Center Area Plan.

DCAP 10.3 Require new development to conform with Desert Tortoise Critical Habitat designation requirements.

3.4.2 Environmental Setting

The project site is located in the upper Chuckwalla Valley, on public lands administered by the BLM in unincorporated Riverside County, approximately 6 miles north of Desert Center, California. The DHSP is located in the Colorado Desert region of the larger Sonoran Desert. Section 3.3.2 provides general descriptions of the Colorado Desert region, the proposed solar facility site, and the alternative gen-tie alignments (see Figure 3.1-1 in Appendix A).

Public lands to the north and east of the proposed solar facility site are within the BLM-designated Palen-Ford WHMA, and a small section of this WHMA extends into the northern portion of the proposed solar facility site (Figure 3.4-1 in Appendix A). The Chuckwalla DWMA is located to the west of the proposed solar facility, adjacent to the western boundary of the southwestern parcel. The gen-tie Alternatives B and C would traverse the northeastern portion of this DWMA, and the southernmost portions of all gen-tie alternatives would cross into the DWMA to interconnect to the Red Bluff Substation (BLM and CDFG 2002).

DWMAs were established in the NECO Plan/EIS to address the recovery of the desert tortoise. These are stand-alone areas which cover much of the designated critical habitat for the desert tortoise. On BLM lands DWMAs are designated ACECs. While various use restrictions are imposed in these areas, the emphasis is placed on minimizing disturbance and maximizing mitigation, compensation, and restoration from authorized allowable uses. Unlike DWMAs, WHMAs address other special-status species and habitat management more generally. Management emphasis is placed on active management, specific species and habitats mitigation, and restoration from authorized allowable uses (BLM and CDFG 2002). Details of the wildlife management areas within the project study area are presented below.

Chuckwalla Desert Wildlife Management Area

The Chuckwalla DWMA was designated to protect desert tortoise as well as significant natural resources, including special-status plant and animal species and natural communities. It encompasses 818,685 acres, 465,287 acres of which (57 percent) are on BLM land. Conservative estimates based on the USGS habitat model (Nussear et al. 2009) indicate that 70 percent of the Chuckwalla DWMA is suitable desert tortoise habitat, with the remaining 30 percent unsuitable. As defined in the NECO Plan, examples of management actions to protect resources within the Chuckwalla DWMA include limitations on cumulative new surface disturbance on lands administered by the BLM within any DWMA to 1 percent of the BLM-administered portion of the DWMA, and implementing other grazing, recreation, and travel restrictions. The proposed and alternative solar facilities would be located outside the Chuckwalla DWMA, but portions of the proposed and alternative gen-tie lines would be located within portions of the DWMA (see Figure 3.4-1 in Appendix A).

Chuckwalla Critical Habitat Unit

Desert tortoise critical habitat comprises several areas (units) designated by the USFWS in 1994 (USFWS 2011a). Critical habitat is considered essential for the conservation of the desert tortoise, based on physical and biological features essential for desert tortoise survival, and requires special management considerations or protection. The Chuckwalla Critical Habitat Unit (CHU) largely, but not entirely, corresponds to the Chuckwalla DWMA, described above. The differences between the Chuckwalla DWMA and CHU are not material for purposes of this analysis. The proposed and alternative solar facilities would be located outside the Chuckwalla CHU, but portions of the proposed and alternative gen-tie lines would be located within it (see Figure 3.4-1 in Appendix A).

Palen-Ford Wildlife Habitat Management Area

As noted above, while DWMAs were established in the NECO Plan to address the recovery of the desert tortoise, WHMAs were established to address other special-status species and habitat management. The Palen-Ford WHMA was specifically established to protect the desert dunes and playas habitats (NECO sensitive habitat types) and the Mojave fringe-toed lizard (BLM and CDFG 2002).

3.4.3 Methodology

Surveys Conducted for the Desert Sunlight Solar Farm Project. The DHSP gen-tie line route Alternatives B (proposed gen-tie), C, and D conform to gen-tie line Alternatives A-1 and A-2, described and analyzed for the Desert Sunlight Solar Farm Project (DSSF) and incorporated by reference in section 1.11 (BLM 2011b). Surveys conducted for the DSSF gen-tie line Alternatives A-1 and A-2 are described in detail in the DSSF EIS (BLM 2011b) and the DSSF Biological Resources Technical Report (Ironwood 2010) and are incorporated here by reference. Relevant studies and results are summarized below:

- Prior to conducting field surveys for the DSSF, a biological resources literature search was performed to identify resources with the potential to occur along the gen-tie line routes. The study area for the gen-tie lines included a 400-foot wide study corridor to allow for some degree of flexibility during final engineering design with the assurance that the final disturbance area would be covered by the respective study areas.
- Full-coverage, protocol-level desert tortoise surveys were conducted within the entire DSSF gen-tie line study area in fall 2009 and spring 2010. Within the gen-tie line A-1 study area, 2 active burrows and 1 live tortoise were observed. Within the gen-tie line A-2 study area, 1 active burrow and no live tortoises were observed.
- A burrowing owl Phase I habitat assessment (CBOC 1993) was conducted within the DSSF gen-tie study area in 2007 and Phase II burrow surveys were conducted concurrent with desert tortoise surveys. Several suitable burrows were identified in both gen-tie study areas. In the DSSF gen-tie line A-1 study area, 1 individual burrowing owl and 2 burrows with sign of recent activity (whitewash and pellets) were identified 1,500 feet east of the intersection of the line and Highway 177. No burrowing owls or sign were recorded along gen-tie line A-2.
- An assessment was conducted on February 17, 2010 to assess potential bat habitat within the DSSF alternatives and gen-tie line routes. Eleven bat species, 5 of which are CDFG Species of Special Concern, were identified as having a potential to occur in the study area although no

bats or active roosts were observed in the study area. Bats are discussed below in Section 3.4.4 and 3.4.5.

- All wildlife species, regardless of conservation status, were recorded during surveys. Additional special-status species detected during surveys of the gen-tie line routes include the following: prairie falcon, loggerhead shrike, and round-tail ground squirrel. These species are discussed below in Section 3.4.5.

Surveys Conducted for the DHSP. A literature search was conducted to identify all special-status wildlife records known from within the DHSP study area. In addition to the literature sources listed in Section 3.3 for botanical surveys, the review included the CDFG's Special Animals List (CDFG 2011b) and Wildlife Habitat Relationship System (2012; http://www.dfg.ca.gov/biogeodata/cwhr/). Based upon review of the literature and databases, above, a list of special-status wildlife species with potential to occur in the vicinity of the project was compiled (see Table 3.4-2). Wildlife species were considered to be special-status species if they were classified as one or more of the categories listed in Table 3.4-1 below:

Table 3.4-1. Definitions Relevant to Special-Status Species Considered in the Draft EIS and Plan Amendment

Species Designation	Agency	Definition
Endangered	USFWS	A species that is in danger of extinction throughout all or a significant portion of its range.
Threatened	USFWS	Any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
Candidate	USFWS	A species the USFWS has designated as a candidate for listing under Section 4 of the ESA, published in its annual candidate review, defined as defined as a species for which has sufficient information on its biological status and threats to propose it as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.
Proposed	USFWS	A species that the USFWS has proposed for listing under Section 4 of the ESA, by publishing a Proposed Rule in the Federal Register.
Protected under the federal Migratory Bird Treaty Act	USFWS	All native bird species in the U.S.
Protected under the federal Bald and Golden Eagle Protection Act	USFWS	Bald and golden eagles.
Endangered	CDFG	A native species or subspecies that is in serious danger of becoming extinct throughout all or a significant portion of its range due to one or more causes, including loss or change in habitat, overexploitation, predation, competition, or disease.
Threatened	CDFG	A native species or subspecies that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.
Candidate	CDFG	A native species that has been officially noticed by the California Fish and Game Commission as being under review by the CDFG for addition to the threatened or endangered species lists. CDFG candidate species are given no extra legal protection under state laws.
Fully Protected (FP)	CDFG	Fully protected under the California Fish and Game Code. The CDFG may not issue take authorization except for scientific purposes or as provided under SB 618 (2011).

Table 3.4-1. Definitions Relevant to Special-Status Species Considered in the Draft EIS and Plan Amendment

Species Designation	Agency	Definition
Species of Special Concern (SSC)	CDFG	A species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria: • Is extirpated from the state or, in the case of birds, in its primary seasonal or breeding role; • Is listed as federally but not state threatened or endangered; • Meets the state definition of threatened or endangered but has not formally been listed; • Is experiencing or formerly experienced serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status; or • Has naturally small populations exhibiting high susceptibility to risk from any factor(s) that if realized, could lead to declines that would qualify it for state threatened or endangered status. SSC is an administrative designation and carries no formal legal status. This designation is intended to focus attention on animals at conservation risk, to stimulate research on poorly known species, and to achieve conservation and recovery before these species meet the CESA criteria for listing. California SSC are considered under CEQA and require a discussion of impacts and appropriate mitigation to reduce impacts.
California Fish and Game Code 3503 and 3513	CDFG	All U.S. native bird species that occur in California.
Protected	CDFG	A species that is not federally or state listed, FP, or SSC, but is protected under the California Fish and Game Code. An example is the desert kit fox, which is afforded protection by the Fish and Game Code as a furbearing mammal.
NECO Plan/EIS	BLM	Special-status species that were addressed in the NECO Plan/EIS due to management concerns within the NECO Planning Area.
Sensitive	BLM	Those species (1) that are under status review by the U.S. Fish and Wildlife Service or National Marine Fisheries Service, (2) whose numbers are declining so rapidly that federal listing may become necessary, (3) those with typically small and widely dispersed populations, or (4) those inhabiting ecological refugia or other specialized or unique habitats.

Biological resources surveys were conducted within the proposed generation facility site and gen-tie line Alternative E from January 2011 through May 2012. Biological resource surveys for gen-tie line Alternatives B, C, and D were conducted in connection with the adjacent DSSF project (see below for more details). Field surveys specific to wildlife resources include general reconnaissance, desert tortoise surveys, a Mojave fringe-toed lizard habitat evaluation, and avian point-count surveys. A Biological Resources Technical Report (BRTR) and a BRTR supplement addressing gen-tie line Alternative E (Appendices C.6 and C.16 respectively) have been prepared based on the results of all field surveys and literature reviews conducted for the proposed project and alternatives to characterize the biological resources that could be directly or indirectly impacted by implementation of the DHSP. The methodology and results for assessing baseline conditions with regard to biological resources are summarized here. Please see the BRTR (Appendix C.6) and BRTR Supplement (Appendix C.16) for further details.

General reconnaissance was conducted during all field surveys for biological resources, and included identification and recording of all plant and animal species observed or otherwise detected.

Focused desert tortoise surveys were conducted during spring 2011 within the proposed solar facility site (both parcels) and spring 2012 on gen-tie line alignment Alternative E. The surveys were conducted in accordance with the current USFWS survey protocol "Preparing for Any Action That May Occur within the Range of the Mojave Desert Tortoise" (USFWS 2010a).

A Mojave fringe-toed lizard habitat evaluation was conducted within the proposed solar facility site boundaries and development footprint on February 25, March 5, and March 12, 2011, and on gen-tie line alignment Alternative E on June 25, 2012 to identify potential habitat, individuals, and/or sign that would indicate potential occupancy of the project site by this species.

Focused breeding season surveys for Gila woodpeckers were conducted throughout potential habitat (desert dry wash woodland) on the proposed solar facility site during spring 2012 by AMEC biologists (Appendix C.20).

Avian point-count surveys were conducted during winter and spring of 2011 to comply with BLM requirements. Winter season point counts were conducted during January 2011, and breeding season point counts were between March 30 and April 28, 2011.

Breeding season surveys for burrowing owls were conducted concurrently with desert tortoise surveys (above). Each burrow encountered during the desert tortoise survey was examined for sign of desert tortoise activity, as well as burrowing owl activity. These surveys provide data that are equivalent to Phase II burrow surveys (CBOC 1993).

The descriptions of regional golden eagle habitat, nest sites, territory occupancy, and winter occurrence in this document are based on the data provided in the DSSF EIS and supporting documents (BLM 2011b), winter 2011-12 field surveys by Bloom Biological Inc. (Appendix C.7), and BLM records of 2012 golden eagle activity. The DSSF Final EIS addressed active and inactive golden eagle nests within a 10-mile radius of the DSSF project and the Red Bluff Substation (incorporated by reference in Section 1.11 of this Final EIS). This 10-mile radius fully encompasses all alternatives of the DHSP project and a corresponding 10-mile radius. The 2012 golden eagle data were provided by Dr. L.F. LaPre, Wildlife Biologist, BLM California Desert District.

Aspen Environmental Group (Aspen) biologists evaluated suitability for seasonal Couch's spadefoot breeding habitat on the project site and gen-tie line Alternative E, based on soils and topography observed during vegetation mapping and streambed delineation field work, described in Section 3.3. Desert kit fox and American badger burrows and sign were noted during desert tortoise surveys and subsequent vegetation mapping and streambed delineation field work, but there were no additional field surveys dedicated to locating these species.

3.4.4 General Wildlife

Below is a description of the common wildlife species that either have been observed or are expected to occur in the habitat types found within the project site and surrounding area. These habitat types correspond to the vegetation communities described in Section 3.3.5.

Creosote Bush Scrub (Sonoran Desert Scrub)

Reptiles observed in the Creosote Bush Scrub (Sonoran Desert Scrub) habitat during field surveys at the generation facility site and along the gen-tie alternatives include desert horned lizard

(*Phrynosoma platyrhinos*), zebra-tailed lizard (*Callisaurus draconoides*), desert iguana (*Dipsosaurus dorsalis*), sidewinder (*Crotalus cerastes*), and Great Basin whiptail (*Aspidoscelis tigris tigris*).

Bird species observed during field surveys in this habitat, or foraging over it, include black-throated sparrow (*Amphispiza bilineata*), Gambel's quail (*Callipepla gambelii*), common raven (*Corvus corax*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*).

Mammal species observed or detected in desert scrub habitat during surveys include coyote (*Canis latrans*), American badger (*Taxidea taxus*), desert kit fox (*Vulpes macrotis arsipus*), black-tailed jackrabbit (*Lepus californicus*), round-tailed ground squirrel (*Spermophilus tereticaudus*), desert woodrat (*Neotoma lepida*), and kangaroo rat (*Dipodomys* sp.). Small mammals detected during small mammal trapping at the adjacent DSSF site, and also expected to occur on the proposed solar facility site, include long-tailed pocket mouse (*Chaetodipus formosus*), Merriam's kangaroo rat (*Dipodomys merriami*), spiny pocket mouse (*Perognathus spinatus*), little pocket mouse (*P. longimembris*), and desert woodrat (BLM 2011b).

Blue Palo Verde–Ironwood Woodland (Desert Dry Wash Woodland)

The Blue Palo Verde–Ironwood Woodland on the site is equivalent to desert dry wash woodland addressed in the NECO Plan. This vegetation type provides greater food, nesting, and cover resources, and wildlife diversity is generally greater than in the surrounding desert, though many of the same species are present. The Blue Palo Verde–Ironwood Woodland (Desert Dry Wash Woodland) in the project study area supports common bird species characteristic of the surrounding desert habitats as well as birds that prefer woodlands. Verdin (*Auriparus flaviceps*) was the most commonly encountered bird in this community on the site in both winter and spring. Other representative species include ash-throated flycatcher (*Myiarchus cinerascens*), black-tailed gnatcatcher (*Polioptila melanura*), mourning dove (*Zenaida macroura*), and non-breeding white-crowned sparrow (*Zonotrichia leucophrys*). Desert dry wash woodlands are particularly important as stopover feeding habitat for many migratory bird species, due to the very high insect productivity in these habitats.

Reptiles and small mammals observed and/or expected in this community are the species listed above for Creosote Bush Scrub (Sonoran Desert Scrub). Desert dry wash woodland attracts foraging bats, such as pallid bats (*Antrozous pallidus*) and California myotis (*Myotis californicus*), due to increased insect concentration. Hoary bats (*Lasiurus cinereus*) will roost in palo verde and ironwood trees. Large mammal species can use desert dry washes and include special-status species such as bighorn sheep (*Ovis canadensis*) and burro deer (*Odocoileus hemionus eremicus*).

Disturbed Areas

Disturbed, ruderal, and non-vegetated areas provide habitat for opportunistic wildlife species. These areas typically offer little cover or food resources, but ground-dwelling species may frequently cross them or incorporate them into their home-ranges. House sparrows (*Passer domesticus*) and house finches (*Carpodacus mexicanus*) often nest on structures or ornamental trees. Red-tailed hawks (*Buteo jamaicensis*) and common ravens frequently nest on the steel lattice towers of transmission lines and feed opportunistically on road-killed animals (ravens) or live

prey such as reptiles and small mammals in open, disturbed areas. Coyotes may also take advantage of these habitats.

3.4.5 Special-Status Wildlife Species

Based on a review of database records, results of surveys for nearby projects, published literature, project surveys, and habitats present in the project study area, a list of special-status wildlife species that could occur or are known to occur in the project area was prepared. Table 3.4-2 lists all special-status wildlife species potentially occurring on the project site or vicinity, and evaluated in the analysis presented here. Further descriptions of these species and their potential occurrence in the area follow Table 3.4-2. Figure 3.4-2 in Appendix A identifies the locations of special-status wildlife species observed or detected during project surveys. These discussions are based on the BRTR (Appendices C.6 and C.16) and other pertinent sources. The potential for occurrence was assessed based on the following criteria:

- **Present**: Taxon (species or subspecies) was observed during surveys or has been documented in the project study area previously.
- **High:** The taxon has been documented within the project study area (5-mile radius) and suitable environmental conditions such as soil type are found within the project area; but the taxon was not detected during project-specific biological surveys.
- **Moderate:** Either the taxon has been documented within the project study area (5 miles), or suitable environmental conditions such as soil type are found within the project area, and the project site is within its known geographic range.
- **Low:** There are no records of the taxon within the project study area (5 miles), the environmental conditions are marginal, and/or the taxon is conspicuous and was not detected during biological surveys.
- **Not Likely to Occur:** No known records exist and the project study area lacks suitable habitat requirements (including soil and elevation factors).

Table 3.4-2. Special-Status Wildlife Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat	Potential to Occur
AMPHIBIANS			
Scaphiopus couchi Couch's spadefoot	Federal: none BLM: Sensitive, NECO State: SSC	Breeds in seasonal rain pools following summer rains; burrows in sand remainder of year; eastern Colorado Desert, generally close to Colorado River	Low. No potential rain pool habitat on solar facility site, rare roadside pools to south; margin of geographic range.
REPTILES			
Gopherus agassizii (Xerobates agassizi) Agassizi's Desert tortoise	Federal: Threatened BLM: NECO State: Threatened	Desert shrublands where soil suitable for burrows; Mojave and Sonoran deserts (E Calif, S Nevada, W Arizona, and Sonora, Mexico)	High. No recent sign was detected on site, but there are known occurrences in the vicinity.

Table 3.4-2. Special-Status Wildlife Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat	Potential to Occur
Heloderma suspectum cinctum Banded Gila monster	Federal: none BLM: Sensitive State: SSC	Rocky outcrops in desert shrubland; scarce in scattered eastern mountain ranges of Calif deserts; to S Nevada, W Arizona, and mainland Mexico	Not Likely to Occur. No verified records in the vicinity, and bajada habitat is not likely to be suitable for this species.
Phrynosoma mcallii Flat-tailed horned lizard	Federal: none BLM: Sensitive, NECO State: SSC	Sandy desert washes, flats, and dunes; Coachella Valley southward to N Baja Calif	Not Likely to Occur. Outside of known range and habitat on site is marginal.
Sauromalus obesus (S. ater) Chuckwalla	Federal: none BLM: NECO State: none	Rocky outcrops in desert shrubland; throughout deserts of Calif, S Nevada, W Arizona, and Baja Calif	Low. No suitable bedrock outcrops; habitat marginal.
Uma notata Colorado Desert fringe-toed lizard	Federal: none BLM: Sensitive, NECO State: SSC	Sand, especially dunes, sandy hummocks, washes, stabilized sand flats; southern Colorado Desert, Imperial Valley, SW Arizona, adjacent Mexico	Not Likely to Occur. Outside of known range and habitat on site is marginal.
Uma scoparia Mojave fringe-toed lizard	Federal: none BLM: Sensitive, NECO State: SSC	Sand, especially dunes, sandy hummocks, washes, stabilized sand flats; below sea level to about 3000 ft elev; Death Valley, SW to Antelope Valley and SE to W Arizona	Low (solar facility site and gen-tie Alts B, C, & D). Marginal habitat; no extensive areas of sandy substrates that could support this species. Present (gen-tie Alt E). Observed in sand dune habitats along this alignment.
Charina trivirgata (Lichanura trivirgata) Rosy boa	Federal: none BLM: NECO State: none	Rocky chaparral and desert shrubland; generally below about 4500 ft elev; S Calif through Baja Calif, SW Arizona, and western Sonora	High. Suitable habitat occurs throughout project area.
BIRDS			
Accipiter cooperii Cooper's hawk	Federal: none BLM: none State: Watch List	Nests and hunts in forest & woodland, also forages in open areas; most of U.S., Central and S America	High: Wintering/migration only; not likely to nest in project area (no habitat).
Accipiter striatus Sharp-shinned hawk	Federal: none BLM: none State: Watch List	Nests and hunts in forest & woodland mainly to N (may breed in S Calif Mtn woodlands); also forages in open areas; regularly winters in S Calif	Present: Observed wintering on site (January 2011). Not likely to nest in project area (no habitat, outside breeding range).
Aquila chrysaetos Golden eagle	Federal: BGEPA, BCC BLM: Sensitive, NECO State: FP, Watch List	Nests in remote trees and cliffs; forages over shrublands and grasslands; breeds throughout W N America, winters to E coast	High. Foraging only (year round). While this species nests in surrounding mountains, no suitable nesting habitat occurs on site.
Asio flammeus Short-eared owl	Federal: none BLM: none State: SSC	Breeds in marshes and densely vegetated wetlands, forages over open wetlands, ag fields, and grasslands; temperate N & S America, Eurasia	Low. No suitable breeding or foraging habitat; marginal wintering habitat.

Table 3.4-2. Special-Status Wildlife Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat	Potential to Occur
Asio otus Long-eared owl	Federal: none BLM: none State: SSC	Breed in riparian woodlands; forage (nocturnally) over open land; sea level to about 6000 ft elev; through N America and Eurasia	Moderate. Occurs at Lake Tamarisk during winter; may forage over the project area. Not likely to nest in project area (no habitat).
Athene cunicularia (Speotyto cunicularia) Burrowing owl	Federal: BCC BLM: Sensitive, NECO State: SSC	Nests mainly in rodent burrows, usually in open grassland or shrubland; forages in open habitat; increasingly uncommon in S Calif; occurs through W U.S. and Mexico	Present (migration/winter season). Observed on site in September 2011. Not observed during breeding season surveys.
Buteo regalis Ferruginous hawk	Federal: BCC BLM: NECO State: Watch List	Forages over grassland and shrubland; winters in W and SW N Amer (breeds in Great Basin and N plains)	High. Wintering/migration only; not likely to nest in project area (outside breeding range).
Buteo swainsonii Swainson's hawk	Federal: BCC BLM: Sensitive State: Threatened	Breeds in trees in open habitats (e.g., grassland), Central Valley (Calif) and east to central U.S., S Canada, N Mexico; winters in S America. A few nesting records in W Mojave Desert (e.g., Lancaster area)	Present. Occasionally flies over project area during migration. Not likely to nest in project area (outside breeding range; no suitable nesting habitat).
Chaetura vauxi Vaux's swift	Federal: none BLM: none State: SSC	Breeds central Calif and northward, in coastal and montane forests; winters in Central and S America	Present. Occasionally flies over project area during migration. Not likely to nest in project area (outside breeding range; no suitable nesting habitat).
Charadrius montanus Mountain plover	Federal: BCC BLM: Sensitive, NECO State: SSC	Short sparse grasslands, plowed fields, open sagebrush and foothill valley floors; winter through W Calif and south into Mexico, primarily in Sacramento, San Joaquin, and Imperial Valleys.	Low. Outside breeding range; winter foraging habitat poorly suitable due to high shrub cover. NECO Plan identifies wintering habitat in agricultural areas just south and east of the project site.
Circus cyaneus Northern harrier	Federal: none BLM: none State: SSC	Breeds colonially in grasslands and wetlands; forages over open terrain; N America and Eurasia	Low. May forage on site in winter. Not likely to nest in project area (no habitat).
Falco columbarius Merlin	Federal: none BLM: none State: Watch List	Uncommon in winter in S Calif desert and valleys (breeds in northern N America and Eurasia)	High. Wintering/migration only; not likely to nest in project area (outside breeding range).
Falco mexicanus Prairie falcon	Federal: BCC BLM: NECO State: Watch List	Nests on high cliffs, forages primarily over open lands; occurs throughout arid western U.S. and Mexico	Present. Foraging only (year round). While this species nests in surrounding mountains, no suitable nesting habitat occurs on site. Observed in May 2012 during surveys of Alternative E.
Falco peregrinus American peregrine falcon	Fed: BCC (former END) BLM: none Calif: FP (former END)	Nests on high cliffs, generally near water bodies; feed on birds (esp. shorebirds & waterfowl); widespread but rare worldwide	Not Likely to Occur (except as infrequent flyover). No suitable nesting or foraging habitat.
Lanius ludovicianus Loggerhead shrike	Federal: BCC BLM: none State: SSC	Woodlands, shrublands, open areas with scattered perch sites; not dense forest; widespread in N America; valley floors to about 7000 ft elev	Present. Recorded throughout project site during avian point count surveys. Suitable habitat occurs throughout project area.

Table 3.4-2. Special-Status Wildlife Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat	Potential to Occur
Melanerpes uropygialis Gila woodpecker	Federal: BCC BLM: NECO State: Endangered	Saguaro woodlands, sometimes other woodlands; cavity nester mainly in cactus; SE Calif, S Arizona, W Mexico (incl. Baja)	Present. Foraging only; recorded on site in winter (January 2011). Not likely to nest on site (no suitable habitat).
Aphelocoma californica cana Scrub jay (Eagle Mountains population)	Federal: none BLM: none State: CDFG watch list	Locally endemic year-around resident in pinyon woodlands in the Eagle Mountains; long-disjunct from other populations	Present. Observed as transient, Oct 2011.
Oreothlypis luciae (Vermivora luciae) Lucy's warbler	Federal: BCC BLM: Sensitive State: SSC	Cavity-nesting species; breeds in desert riparian woodlands through much of Arizona; winters on Pacific Coast of mainland Mexico	Present. Recorded on site during migration. Not likely to nest on site (outside known range; nest cavities unavailable).
Pandion haliaetus Osprey	Federal: none BLM: none State: Watch List	Nests in northern N America and Mexican coastlines near large water bodies, preys primarily on fish; winters in central Calif to S America;	Present. Occasionally flies over project area during migration. Not likely to nest in project area (outside breeding range; no suitable nesting habitat).
Polioptila melanura Black-tailed gnatcatcher	Federal: None BLM: None State: Special Animal	Desert shrublands, gen. nests in shrub thickets along washes; occas. in open scrub (esp. in winter); Calif. deserts, to W Texas, Baja, and central Mexico	Present. Observed during point count surveys on site, and along Alternative E.
Pyrocephalus rubinus Vermilion flycatcher	Federal: none BLM: NECO State: SSC	Desert riparian woodlands and shrublands; SE Calif, east through S Texas, and S through Mexico; winters in Mexico	Low. Marginal nesting habitat occurs in ironwood stands on site.
Spizella breweri Brewer's sparrow	Federal: none BLM: none State: Special Animal (nesting)	Much of western N America; nests in arid montane shrublands and grasslands (sagebrush scrub, etc.); winters in lower elev shrublands	Moderate (winter). Suitable wintering habitat throughout the area. Not expected during breeding season due to habitat and elevation.
Toxostoma bendirei Bendire's thrasher	Federal: BCC BLM: Sensitive, NECO State: SSC	Joshua tree woodland, desert scrub; high cactus cover; mainly E Mojave Desert in Calif (scarce in W Mojave); American SW and mainland Mexico; winters in S Arizona, New Mexico, and mainland Mexico	Low-moderate. Marginally suitable habitat occurs throughout project area. Nearest record is 6.5 miles south of the project site.
Toxostoma crissale Crissal thrasher	Federal: none BLM: NECO State: SSC	Nests in dense, low, brushy thickets of mesquite or other desert riparian shrubs; Sonoran Desert, E Mojave Desert to Texas, W mainland Mexico	Low. Habitat on site is marginally suitable for nesting, foraging.
Toxostoma lecontei Le Conte's thrasher	Federal: BCC BLM: NECO State: SSC	Calif deserts, SW Central Valley & Owens Valley, E to Utah, Arizona; open shrubland, often sandy or alkaline flats	High. Suitable habitat occurs throughout project area. Nearest record is 6.5 miles south of the project area.

Table 3.4-2. Special-Status Wildlife Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat	Potential to Occur
MAMMALS			
Antrozous pallidus Pallid bat	Federal: none BLM: Sensitive, NECO State: SSC	Rock outcrops of shrublands, mostly below about 6000 ft elev; Calif, SW N Amer through interior Oregon and Washington; hibernates in winter	High. Likely to forage on site; low potential for roosting (minimal potential roosting habitat). Nearest record is 11 miles south of the project site.
Corynorhinus (Plecotus) townsendii Townsend's big-eared bat (including subspecies)	Federal: none BLM: Sensitive, NECO State: SSC	Many habitats throughout Calif and W N Amer, scattered populations in E; day roosts in caves, tunnels, mines; feed primarily on moths	High. Likely to forage on site; low potential for roosting (minimal potential roosting habitat).
Euderma maculatum Spotted bat	Federal: none BLM: Sensitive State: SSC	Desert (cool seasons) to pine forest (summer), much of SW N Amer but very rare; roosts in deep crevices in cliffs, feeds on moths captured over open water	Low. Marginal roosting or foraging habitat on site.
Eumops perotis californicus California mastiff bat	Federal: none BLM: Sensitive, NECO State: SSC	Lowlands (with rare exceptions); central and S Calif, S Arizona, NM, SW Texas, N Mexico; roost in deep rock crevices, forage over wide area	High. Likely to forage on site; low potential for roosting (minimal potential roosting habitat). Nearest record is 11 miles south of sol facility site.
Lasiurus xanthinus (Nycteris ega xanthina) Western (Southern) yellow bat	Federal: none BLM: none State: SSC	Mexico and Central America, to S Arizona; Riverside, Imperial, and San Diego Counties; riparian and wash habitats; in roosts trees; evidently migrates from Calif during winter	High. Likely to forage on site; low potential for roosting (minimal potential roosting habitat).
Macrotus californicus (M. waterhousii) California leaf-nosed bat	Federal: none BLM: Sensitive, NECO State: SSC	Arid lowlands, S Calif, S and W Arizona, Baja Calif and Sonora, Mexico; roost in mineshafts, forage over open shrublands	High. Likely to forage on site; low potential for roosting (minimal potential roosting habitat). Nearest records are 6 miles northwest of solar facility, roosting at various mines in Eagle Mountains.
Nyctinomops macrotis (Tadarida molossa) Big free-tailed bat	Federal: none BLM: none State: SSC	Roosts in crevices of rocky cliffs, scattered localities in W N America through Central America; ranges widely from roost sites; often forages over water	High. Likely to forage in the project area, but low potential for roosting on site (lack of potential roost sites).
Nyctinomops femorosaccus (Tadarida femorosaccus) Pocketed free-tailed bat	Federal: none BLM: NECO State: SSC	Deserts and arid lowlands, SW U.S., Baja Calif, mainland Mexico; Roost mainly in crevices of high cliffs; forage over water and open shrubland	High. Likely to forage in the project study area, but low potential for roosting on solar facility site (lack of potential roost sites).
Xerospermophilus tereticaudus chlorus Palm Springs round-tailed ground squirrel	Federal: none BLM: Sensitive State: SSC	Widespread in Calif deserts, Coachella Valley to Death Valley; formerly considered endemic to mesquite and sandy habitats in Coachella Valley	Present. Reported on solar facility site and near gen-tie Alternatives B and C.

Table 3.4-2. Special-Status Wildlife Present or with Potential to Occur in the Project Study Area

Species	Status	Habitat	Potential to Occur
Neotoma albigula venusta Colorado Valley woodrat	Federal: none BLM: NECO State: none	Desert shrublands; SE Calif, SW Arizona, adjacent Mexico, and southernmost Nevada; closely associated with beavertail or mesquite thickets	Low. Marginal habitat on site. Nearest record is 12 miles southeast of solar facility near Corn Spring campground.
Bassariscus astutus Ring-tailed cat	Federal: none BLM: none State: FP	Most of Calif and the SW U.S., to tropical Mexico; forests, woodlands, deserts; nocturnal; dens in burrows, trees, or rock crevices; in deserts, found on steep rocky slopes and boulderfields	Not Likely to Occur. No suitable denning habitat.
Taxidea taxus American badger	Federal: none BLM: none State: SSC	Mountains, deserts, interior valleys where burrowing animals are avail as prey and soil permits digging; throughout central and W N America	Present. Burrows recorded on site; expected in low numbers throughout project area.
Vulpes macrotis arsipus Desert kit fox	Federal: none BLM: none State: Protected	Widespread, open desert lands; constructs below-ground dens; requires soil suitable for burrowing; primarily nocturnal; preys on small mammals	Present. Numerous burrows recorded on site.
Felis concolor browni Yuma mountain lion	Federal: none BLM: NECO State: SSC	Low desert, Joshua Tree National Park, to Colorado River; primarily in dense riparian habitats of river and dense desert wash scrub of canyons, where water and prey are available	High. Expected in low numbers throughout the project study area.
Odocoileus hemionus eremicus (O. h. crooki) Desert mule deer, burro deer	Federal: none BLM: NECO State: none	Colorado desert, scattered mountains and bajadas, generally near dependable water sources	High. Expected in low numbers throughout the project study area.
Ovis canadensis nelsoni Nelson's bighorn sheep, Desert bighorn sheep	Federal: none BLM: Sensitive, NECO State: none	Open shrublands and conifer forest, remote mountains; scattered populations in desert mountains and surrounding ranges, incl Transverse and Peninsular ranges	High. Animals may pass through solar facility site and gen-tie alternatives to move among neighboring mountain ranges (Eagle, Coxcomb, Chuckwalla, Granite, and Northern Palen Mountains).

Federal:
BCC – USFWS Bird of Conservation Concern
Delisted – No longer federally listed due to recovery
BGEPA – Protected under the Bald and Golden Eagle Protection Act

BLM:
Sensitive – Species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA.
NECO – Special-status species that were addressed in the NECO Plan/EIS due to management concerns within the NECO Planning Area.

State:
SSC – CDFG Species of Special Concern
FP – CDFG Fully Protected
Watch List – The birds on this watch list are 1) not on the current species of special concern list but were on previous lists and have not been listed under the California ESA; 2) were previously State or federally listed and now are on neither list; or 3) are on the list of FP species.
Delisted – No longer State listed due to recovery
Special Animal – Taxa is tracked in the CNDDB but is not designated with any other special status at the State or federal level.
Source: CNDDB 2011; BLM and CDFG 2002; CDFG 2011; BLM 2011b, 2011c, 2010a, and 2010b.

No special-status invertebrates are reported from the project vicinity. Although not assigned any special regulatory status, the desert leaf-cutting ant (Acromyrmex versicolor) is an unusual insect that has been reported from the Chiriaco Summit area and eastern Imperial County. These are the only documented California locations, though it is more widespread in Arizona, Texas, and Mexico. It has no agency-designated conservation status, but is unusual because it is the only leafcutter ant in the state. It may occur in desert dry wash woodland on the site, though no habitat evaluation or focused surveys for invertebrates were conducted.

Amphibians

Couch's Spadefoot (Scaphiophus couchii)

Couch's spadefoot, a toad-like amphibian, is a BLM Sensitive Species and CDFG Species of Special Concern. Like other spadefoot species, it is an amphibian with appearance and life history characteristics similar to the true North American toads (*Anaxyrus* [*Bufo*] ssp.) but distinguished from that genus by several characteristics, especially the thickened sharp-edged "spades" on the hind feet, used for burrowing (Stebbins 2003). Couch's spadefoot is almost entirely terrestrial. It is dormant in burrows 20 to 90 centimeters deep for 8 to 10 months of the year (Jennings and Hayes 1994). It is active on the surface only during periods following warm summer rains, when it emerges to feed on insects and to reproduce. Successful reproduction requires warm rain pools which must hold water while the eggs hatch and the tadpoles develop, and then metamorphose into juvenile spadefoots. During field surveys of hydrologic features throughout the project area, biologists looked for soil and topographic conditions that could provide potential for extended pooling, which might indicate suitable breeding habitat for Couch's spadefoot. There is no potential breeding habitat on the proposed solar facility site. The only potential pools seen in the vicinity are on roadsides, where road crossings impede flow. In some cases, roadside impoundments are within or near the proposed or alternative gen-tie lines. Even in these cases, the potential for Couch's spadefoot occurrence in the area is low due to disturbance and degradation by vehicles of roadside impoundments.

Reptiles

Agassiz's Desert Tortoise (Gopherus agassizii)

Agassiz's desert tortoise is listed as threatened under CESA, and the Mojave population (i.e., west of the Colorado River) is listed as threatened under the federal ESA. East of the Colorado River, Morafka's desert tortoise range extends into the Arizona deserts, and south through Sonora (Mexico). Recent evidence suggests that these two desert tortoise populations are distinct species (Murphy et al. 2011). All wild desert tortoises in California are part of the state and federally listed Mojave population (*Gopherus agassizii*).

The proposed solar facility site is not within designated critical habitat for the desert tortoise, but portions of each of the gen-tie line alternative alignments are within the Chuckwalla CHU, east of Kaiser Road in the vicinity of Interstate 10 (see Figure 3.4-1 in Appendix A).

The nearest documented desert tortoise locations are on the DSSF Solar Farm project site, north of the proposed DHSP solar facility site and at the Red Bluff Substation site (BLM 2011b). Tortoises and recent sign were found on the DSSF site, about 0.3 miles north of the proposed solar facility site, and along the gen-tie Alternatives B and C (BLM 2011b). In addition, a road-

killed desert tortoise was observed at the Eagle Mountain off ramp on eastbound Interstate 10 approximately 7.5 miles southwest of the site (see the BRTR in Appendix C.6 for more details).

The USFWS reviewed desert tortoise biology and population status in the recent Revised Recovery Plan (USFWS 2011a). The following summary is based on that review and literature cited therein. Desert tortoises spend much of their lives in burrows. They enter hibernation during autumn. In late winter or early spring, they emerge from over-wintering burrows and typically remain active or partially active through fall. Activity decreases in summer, but tortoises often emerge after summer rain storms to drink and to take advantage of seasonal food availability during the few weeks following late summer rains. They may become dormant during extended periods of summer heat and dryness. A single tortoise may have a dozen or more burrows within its home range, and different tortoises may use these burrows at different times. Even during their active seasons, they are inactive during much of the day or night, within burrows or at "palettes" (partially sheltered flattened areas, often beneath shrubs or large rocks) or other shaded sites.

Adult desert tortoises lose water at such a slow rate that they can survive for more than a year without access to free water of any kind and can apparently tolerate large imbalances in their water and energy budgets. During periods of inactivity, their metabolism and water loss are reduced. Desert tortoises eat a wide variety of herbaceous vegetation, particularly grasses and the flowers of annual plants.

Desert tortoise habitats include many landforms and vegetation types of the Mojave and Sonoran Deserts, except the most precipitous slopes. Friable soils, such as sand and fine gravel, are important for burrow excavation and nesting, and the availability of suitable soils is a limiting factor to desert tortoise distribution. Dissected alluvial fans and upper bajadas are often considered important habitat areas, thought habitat modeling by USGS (Nussear et al. 2009) indicate relatively low quality habitat on the proposed solar facility site.

The sizes of desert tortoise home ranges vary with respect to location and resource availability, and may vary among years. Male tortoises' home ranges can be as large as 200 acres, while females' long-term home ranges may be less than half that size. Core areas used within tortoises' larger home ranges depend on the number of burrows. Over its lifetime, a desert tortoise may use more than 1.5 square miles of habitat and may make periodic forays of several miles at a time.

Tortoises are long-lived and grow slowly. They require 13 to 20 years to reach sexual maturity. Their reproductive rates are low, though their reproductive lifespan is long. Mating may occur both during spring and fall. The number of clutches (set of eggs laid at a single time) and number of eggs that a female desert tortoise produces is dependent on habitat quality, seasonal food and water availability, and the animal's physiological condition. Egg-laying occurs primarily between April and July; the female typically lays 2-14 (average 5-6) eggs, which are buried near the mouth of a burrow or beneath a shrub. The eggs typically hatch 90 to 120 days later, between August and October. Clutch success rates are unknown and nest predation rates are variable, but predation appears to be an important cause of clutch failure.

Desert tortoise population trends have been difficult to discern. The USFWS (2011a) reviews population monitoring efforts dating back to the 1980s, and concludes that available data provide qualitative (not quantitative) insight to range-wide trends, and show appreciable declines at the

local level in some areas. A more formal and consistent range-wide monitoring study was initiated in 2001, but no range-wide trend has been identified over that period.

Desert tortoise populations are threatened by several factors, each of which tends to be exacerbated by the others and most of which are associated with human land uses and other human activities. Most threats identified in the 1980s as the basis for state and federal listing continue to affect tortoise populations today. Habitat degradation and loss due to land use conversion, grazing, mining, energy development, and transportation projects have all contributed to declining tortoise numbers and fragmented populations. Off-road vehicle use degrades habitat and causes direct mortality from vehicle collision or crushed burrows. Desert tortoises are also vulnerable to vehicle collisions on roads and highways. Drought, habitat degradation, and associated weed invasion lead to reduced nutrient quality of food plants; this increases desert tortoise susceptibility to upper respiratory tract disease, and possibly other diseases, which can be fatal and transmittable among populations. Juvenile tortoises are vulnerable to predation by ravens, and both juvenile and adult tortoises are preyed upon by coyotes and domestic and feral dogs. Since infrastructure development and urbanization creates perch sites and food and water sources for ravens, and typically increases the numbers of dogs and coyotes in a given area, those activities tend to elevate predation pressure on tortoises. Other factors affecting tortoises and their habitat include illegal collecting, vandalism, livestock grazing, feral burros, invasive non-native plants, changes to natural fire regimes, and environmental contaminants. Habitat fragmentation and development can isolate tortoise populations, further increasing risk of disease and reducing genetic diversity. This range of threats can kill or indirectly affect desert tortoises and their habitat, but little is known about the relative contribution each threat makes to tortoise demography. Current recovery planning (USFWS 2011a) focuses on expanding the knowledge of individual threats and places emphasis on understanding their multiple and combined effects on tortoise populations.

The USFWS (2011a) identifies five recovery units for the desert tortoise based largely on geographic discontinuities or barriers that coincide with observed variation among tortoise populations. The DHSP alternatives are located in the Colorado Desert Recovery Unit.

No live desert tortoises or recent sign were observed within the survey area for the proposed solar facility or gen-tie alignment Alternative E. However, several desert tortoise burrows, designated as Class 2 (good condition) and Class 3 (deteriorated condition), and several disarticulated bone fragments, possibly originating from a desert tortoise, were located. None of the burrows or other sign exhibited any evidence of recent use or corroborating sign. However, desert tortoises are generally found throughout the region where the solar facility would be located. Moreover, based on the presence of active desert tortoises on the adjacent DSSF project site and associated gen-tie alignments, it is assumed that the entire solar facility site and all gen-tie line alternative alignments might be occupied by desert tortoises at any time, albeit only in low numbers.

Mojave Fringe-Toed Lizard (Uma scoparia)

The range of the Mojave fringe-toed lizard is almost exclusively limited to California, in southernmost Inyo, San Bernardino, and eastern Riverside Counties, although it has been recorded in western Arizona as well (Jennings and Hayes 1994). It is a CDFG Species of Special Concern and a BLM Sensitive Species. One genetic lineage of the species, associated with the

Amargosa River drainage system, is under review for federal listing as a threatened or endangered population. The southern lineage is more widespread, ranging through the Mojave River drainage system, Bristol Trough, Clark's Pass (including the Chuckwalla Valley, Palen Lake, and Pinto Wash), and the Colorado River sand transport systems.

The Mojave fringe-toed lizard is related to two other special-status species: the Colorado Desert fringe-toed lizard (*U. notata*), a BLM Sensitive Species that is found farther to the south; and the Coachella Valley fringe-toed lizard (*U. inornata*), a federally listed threatened and state listed endangered species endemic to the Coachella Valley, west of the project study area. In addition, the flat-tailed horned lizard (*Phrynosoma mcallii*) is a special-status species of similar habitats, but its geographic range is also well south of the project study area.

The Mojave fringe-toed lizard is primarily insectivorous. It hibernates during winter and emerges from hibernacula in March or April. During April and May, while temperatures are relatively cool, it is active during mid-day; during summer, it is active in mornings and late afternoon, but seeks cover during the hottest parts of the day. It is primarily found in fine, loose, aeolian (windblown) sand habitat. Availability of soft sand is an essential habitat component, though the lizards will also use other substrates in the areas surrounding aeolian sands. The Mojave fringe-toed lizard burrows in the sand to avoid predators and to thermoregulate, and lays its eggs in sand. Sand dunes are its primary habitat, although it also uses sands and surrounding habitats at the margins of dry lakebeds, washes, and isolated blows and pockets against hillsides, and mixed habitat such as hummocks or pockets of soft sand interspersed with hard-packed sand and less suitable densities and composition of vegetation.

The Mojave fringe-toed lizard is widespread in the Mojave and northern Colorado Deserts, but its distribution is patchy, reflecting the discontinuous distribution of windblown sand habitat. Some local populations consist of only a few animals in small, isolated habitat patches. This fragmented distribution leaves local populations vulnerable to extirpation from habitat disturbance, further fragmentation, or stochastic events. Aeolian sand habitat is vulnerable to direct and indirect disturbances. Environmental changes that stabilize sand, affect sand sources, or block sand movement corridors will, in turn, affect Mojave fringe-toed lizard habitat and populations. Threats to Mojave fringe-toed lizards and their habitat include habitat loss or damage from urban and agricultural development, vehicles, and indirect effects such as invasive weeds and increased habitat access by common ravens or other predators. Another important indirect disturbance is the potential disruption of sand sources for the dune systems. Dune habitat that is cut off from its sand source will degrade over time as finer sands are blown away, leaving behind smaller dunes composed of coarser-textured sand.

The proposed solar generation facility site and gen-tie Alternatives B, C, and D do not appear to provide suitable habitat for Mojave fringe-toed lizard (Black 2011; see Appendix C.13). Ephemeral washes and channels throughout these areas provide patchy alluvial sand habitats, but the sand is often cemented or compacted, and the sand depth and coarse texture are poorly suitable for Mojave fringe-toed lizard. There are few areas where deeper, loose sand is present on site; these are isolated and associated with ephemeral washes. However, portions of gen-tie Alternative E would cross occupied Mojave fringe-toed lizard habitat along the western margin of the dune system at the bases of the Coxcomb Mountains. The animals were observed along portions of Alternative E during field surveys for the DSSF project (BLM 2011b) and for the DHSP (Appendix C.16, BRTR Supplement).

Rosy Boa (Charina trivirgata)

The rosy boa occurs in rocky shrublands from sea level to about 6,700 feet elevation. In the coastal regions, it is found south and west of the major mountain chains, in the interior valleys and mountains of Los Angeles, Riverside, San Bernardino, and Orange counties, southward to the coast in San Diego County and Baja California. In the deserts, rosy boas range throughout most of the Mojave Desert and much of the Colorado Desert, eastward into Arizona. They are active during warm seasons, and are primarily nocturnal. The CDFG's Natural Diversity Database (CNDDB) considers rosy boa a "special animal" but it has no formal status under state or federal Endangered Species Acts or any other special-status designation. While the DHSP's study area is within the general geographic range of the rosy boa, and therefore the site could potentially be occupied at low density, the habitat actually observed at the proposed solar facility site and gen-tie alignment alternatives is generally suitable for rosy boa, but lacks the boulders or rock crevices of its primary habitat.

Birds

Golden Eagle (Aquila chrysaetos)

Golden eagles are protected under the BGEPA, are a BLM Sensitive Species, and considered a bird of conservation concern by the USFWS. They are also Fully Protected in California, and are covered under the MBTA and California Fish and Game Code. Golden eagles are year-round residents throughout most of their range in the western United States. In the southwest, they are more common during winter when eagles that nest in Canada migrate south into the region. They breed from late January through August, mainly during late winter and early spring in the California deserts. In the desert, they generally nest in steep, rugged terrain, often on sites with overhanging ledges, cliffs or large trees that are used as cover. Golden eagles are wide-ranging predators, especially outside of the nesting season, when they have no need to return daily to eggs or young at their nests. The mountain ranges surrounding the proposed solar facility site provide suitable golden eagle nesting and foraging habitat. Golden eagle nesting territories generally comprise several nests within a given area. In any given year, the eagles may initiate nesting behavior (e.g., "nest decorating") at one nest, without any activity at the other nests. The eagles may complete breeding by laying eggs and raising chicks, or may abandon the nest without laying eggs or successfully raising young. In any given year, all or most nests in a territory may be inactive, but eagles may return in future years to nest at previously inactive sites. Eight inactive golden eagle nests were documented in the DSSF Final EIS and its appendices within a 10-mile radius of the DHSP site, to the northwest, northeast, and south of the proposed solar facility site. The nearest inactive nest was about 5 miles to the northeast. Additionally, one active but non-reproductive nest was reported in the Coxcomb Mountains, about 5 miles northeast of the site (BLM 2011b). Updated BLM records (L.F. LaPre 2012, personal communication) indicate a total of 10 nests within a 10-mile radius of the DHSP solar facility site. There was early breeding season activity at one of these nests in 2012 but there was no reproduction and no golden activity there by late May, 2012. In order to minimize likelihood of future disturbance or harassment to the sites, the specific nest locations are not provided here. In addition, an adult golden eagle was observed soaring over the eastern portion of the 10-mile radius survey area in January 2012 (Bloom Biological 2012; see Appendix C.7).

Golden eagle foraging habitat consists of open terrain such as grasslands, deserts, savanna, and early successional forest and shrubland habitats, throughout the regional foothills, mountains, and deserts. They prey primarily on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion.

The solar facility site and the gen-tie alternative alignments are on the Chuckwalla Valley floor, and do not provide suitable golden eagle nesting habitat but do provide suitable foraging habitat. The following discussion is based on known golden eagle seasonal occurrence in the region, and on documented nest sites and nest activity within 10 miles of the site (BLM 2011b). Due to the site's proximity to one recently active nest site and several additional sites that were inactive in 2010 but could be used in future years, locally nesting golden eagles could forage at the proposed solar facility site during breeding season. Non-nesting eagles also could forage there throughout the remainder of the year. In addition to mated pairs using the surrounding nesting territories, foraging birds could include wintering or migratory birds (outside the breeding season) and unmated golden eagles or adult birds whose nests may have failed could forage over the site during the breeding season.

Burrowing Owl (Athene cunicularia)

The burrowing owl is a BLM Sensitive Species and a CDFG Species of Special Concern. As a native bird, it is also protected by the MBTA and the California Fish and Game Code. It is a small, terrestrial owl of open country. During the breeding season, it ranges throughout most of the western U.S. It occurs year round in southern California, but may be more numerous during fall and winter, when migratory individuals from farther north join the regional resident population. Burrowing owls favor flat, open annual or perennial grassland or gentle slopes and sparse shrub or tree cover. They use the burrows of ground squirrels and other rodents for shelter and nesting. Availability of suitable burrows is an important habitat component. Where ground squirrel burrows are not available, the owls may use alternate burrow sites or man-made features (such as drain pipes or debris piles). In the California deserts, burrowing owls generally occur in low numbers in scattered populations, but they can be found in much higher densities near agricultural lands where rodent and insect prey tend to be more abundant. Burrowing owl nesting season, as recognized by the California Burrowing Owl Consortium, is 1 February through 31 August (CBOC 1993) but may vary with latitude and climate (CDFG 2012).

Concurrent with the desert tortoise surveys for the solar facility site and gen-tie alignment Alternative E (conducted during spring 2010 on the larger northwestern parcel, spring 2011 on the small parcel, and spring 2012 on the gen-tie line alignment), biologists examined all potentially suitable burrows for sign of burrowing owls. These field surveys correspond to 100 percent coverage Phase II surveys for burrowing owls, according to the CBOC protocol (CBOC 1993). No burrowing owls or their sign were observed during these spring season surveys or during the winter and breeding season avian point count surveys. However, two incidental burrowing owl observations were recorded during streambed delineation field work on the proposed solar facility site. In one observation, a burrowing owl was briefly seen perching and flying, but was not at a burrow. The other observation was a burrowing owl seen in the mouth of an inactive desert kit fox burrow; no burrowing owl sign (e.g., whitewash, prey remains, or owl pellets) was found on the proposed solar facility site or on gen-tie alignment Alternative E. Based on these field surveys and incidental observations, it was determined that the solar facility project study area provides suitable habitat for burrowing owls during winter or breeding

seasons. Breeding burrowing owls were not present on the site during the desert tortoise surveys, but they could nest in the project study area in future years. During fall and winter, the proposed solar site and the proposed and alternative gen-tie alignments appear to serve as low-density seasonal burrowing owl habitat.

Swainson's Hawk (Buteo swainsoni)

The Swainson's hawk is listed as a threatened species under CESA but has no federal listing status. It is also protected under the MBTA and California Fish and Game Code. It is a migratory raptor that breeds in open plains and prairies in the Great Plains and relatively arid areas of western North America, including the Central Valley and the western Mojave Desert. It winters in South America, primarily in Argentina. During the spring and fall migration seasons, Swainson's hawks are observed regularly in southern California. One Swainson's hawk was observed flying over the proposed solar facility site in April 2011. The project study area may serve as incidental foraging habitat during migratory seasons, but otherwise would not support Swainson's hawks, due to the distance from its breeding range.

Gila Woodpecker (Melanerpes uropygialis)

The Gila woodpecker is listed as endangered under CESA but has no status under the federal ESA. It is identified as a bird species of conservation concern by the USFWS, and is also protected under the federal MBTA and California Fish and Game Code. Its geographic range is generally in southern Arizona and southward into Baja California and western mainland Mexico. It occupies this range year round (i.e., it is not migratory). In California, Gila woodpeckers are known from riparian forests along the Colorado River and from desert wash woodlands and residential neighborhoods in Imperial County. Its primary habitat is Cottonwood-Willow Riparian Woodland, but it also uses other desert woodlands (e.g., palo verdes), as well as upland habitats, especially outside the breeding season. It excavates cavity nests in large riparian trees such as cottonwoods and (in upland habitats) saguaro cacti, and feeds largely on insects, mistletoe berries, and cactus fruits. Desert ironwood is apparently too dense for nest excavation. Where Gila woodpeckers occur in dry desert wash woodlands, they excavate cavity nests in large blue palo verde trees. In suburban habitats, they nest in ornamental trees including athel (*Tamarix aphylla*), eucalyptus, and palms. Availability of suitable nesting trees limits breeding habitat suitability.

The project study area is about 40 miles west of the Gila woodpecker's published geographic range, but unpublished observations have been reported from Corn Spring, about 11 miles south of the solar facility site and about 5 miles south of the southern end of the proposed and alternative gen-tie alignments. There is a native palm grove at Corn Spring, and Gila woodpeckers may nest in the palm trees. Also, a Gila woodpecker was reported on 28 September 2010 at the adjacent DSSF project site (BLM 2011b). It is possible that the Corn Spring and Desert Center areas support a small Gila woodpecker population, or that the two local observations in late 2010 were chance observations of an itinerant individual.

Desert wash woodlands on the solar facility site may provide suitable nesting and foraging habitat for Gila woodpecker. The woodlands on the site are dominated by desert ironwood trees, and most of the blue palo verde trees are too small for cavity nests. However, scattered larger blue palo verde trees are present in low numbers throughout the woodlands, and could serve as suitable nest trees.

A Gila woodpecker was observed in the southeastern part of the project site in December 2010, but was not seen again during the BLM protocol winter season or breeding season avian point counts. In spring 2012 (March through May), all desert dry wash woodland habitat was surveyed to determine presence or absence of breeding Gila woodpeckers, but no further Gila woodpecker observations were recorded (see Appendix C.20). Although no Gila woodpecker observations were made in the project study area during BLM protocol point counts or during focused breeding season surveys, there is at least a low probability that they may nest in desert wash woodland habitat on or near the solar facility site or gen-tie alternatives.

Lucy's Warbler (Oreothlypis luciae = Vermivora luciae)

Lucy's warbler is a federal bird of conservation concern, a BLM Sensitive Species, and a CDFG Species of Special Concern. It is also protected under the MBTA and California Fish and Game Code. Lucy's warbler is a migratory songbird that breeds in desert riparian woodlands and winters on Pacific Coast of mainland Mexico. Its breeding range extends through much of Arizona, and parts of the eastern California deserts. It is a cavity nesting species that generally nests in unoccupied woodpecker holes. Its primary nesting habitat is mesquite thickets, but it also uses native riparian trees and non-native athel. Two (2) singing male Lucy's warblers were reported in April 2011 near the southwestern corner of the solar facility site. These birds were not observed later during the nesting season (28 April survey date), though no focused surveys were conducted. It is unknown whether either or both of these birds successfully established breeding territories in the area, or moved on to another site. Suitable nesting cavities may be available in the small number of large blue palo verde trees on the site, but probably not in the more dominant desert ironwood trees (see Gila woodpecker discussion, above). Lucy's warblers may nest in desert wash woodlands on or near the proposed solar facility site and gen-tie alternatives.

Bendire's Thrasher (Toxostoma bendirei)

Bendire's thrasher is a BLM Sensitive Species and CDFG Species of Special Concern. It is also protected under the MBTA and California Fish and Game Code. California populations are migratory, though it is found year round in more southern portions of its range, in southern Arizona and adjacent Mexico. The proposed solar facility site is near the southern boundary of its breeding range in California. It breeds in open, upland desert shrublands of Joshua Tree National Park (JTNP) and surrounding area, and northward through several disjunct regions of the Mojave Desert. Its habitat requirements are poorly understood, but it is generally associated with plants in the genera *Yucca* (e.g., Joshua tree) and *Opuntia* (cholla cacti) on gently sloping terrain. Soil texture is apparently important to habitat suitability, perhaps because Bendire's thrashers largely forage on ground-dwelling insects (BLM 2005). Hard rocky soils (e.g., desert pavement) and loose sands (e.g., dry wash sands) are apparently less suitable than firmly packed, fine-textured soils. Bendire's thrashers were not observed on the proposed solar facility site during the winter or breeding-season point count surveys, but records of this species from the CNDDB exist 6.5 miles to the south. Habitat throughout the site appears to be of marginal suitability, due to relatively low cover of *Yucca* and *Opuntia* species, and seemingly poorly suitable soil texture. There is a low to moderate probability that Bendire's thrasher may occur on the site or along the gen-tie alternatives.

Other Special-Status Raptors

In addition to raptors discussed above, several other special-status birds of prey are found seasonally, especially during winter, in the region. These include osprey, ferruginous hawk, Cooper's hawk, sharp-shinned hawk, northern harrier, prairie falcon, merlin, short-eared owl, and long-eared owl. With the exception of osprey and sharp-shinned hawk, none of these species was observed in the project study area during surveys. Osprey and sharp-shinned hawk were observed flying over the solar facility during winter season point count surveys, but neither species is expected to nest in the area because the project study area is outside of the breeding range and there is no nesting habitat present on or near the proposed solar facility site. Outside their breeding seasons, these raptors need not return to their nests to feed young or tend eggs. Thus, they are able to forage over wide areas, where they capture birds, reptiles, or small mammals. Suitable winter or migratory season foraging habitat for all of these raptors is widely available at the project site and throughout the region.

Upland Perching Birds

Several special-status upland perching bird species are present or have the potential to occur in the project study area. These include loggerhead shrike, Le Conte's thrasher, Vaux's swift, black-tailed gnatcatcher, and vermillion flycatcher. Of these, Vaux's swift, black-tailed gnatcatcher, and loggerhead shrike were recorded in the project study area during surveys. A Vaux's swift was observed over the site during migration season. This species occurs in the area only during migration; it nests well to the north. Loggerhead shrikes were observed on the solar facility site routinely throughout the winter and breeding season avian point count surveys and on gen-tie alignment Alternative E during spring 2012. Black-tailed gnatcatcher was observed on gen-tie alignment Alternative E during April 2012. Le Conte's thrasher has not been reported on site, but habitat is suitable and there are records for this species 6.5 miles south of the proposed solar facility site near the gen-tie alternatives. Vermillion flycatchers have not been reported on site, but nest in similar habitat to the south and could nest in Blue Palo Verde–Ironwood Woodlands (Desert Dry Wash Woodland) in the project study area in future years. The Eagle Mountains scrub jay population resides year round in pinyon woodlands in the Eagle Mountains to the west and northwest of the proposed solar facility site. It is disjunct from other scrub jay populations, and is on CDFG's "watch list" but has no other special conservation status. A scrub jay was observed on the project site in October 2011; presumably, it was wandering or dispersing from habitat in the Eagle Mountains. However, no suitable scrub jay habitat is found in the project study area.

Mammals

Special-Status Bats

A number of bat species that are designated as Sensitive by the BLM and/or Species of Special Concern by CDFG have a high potential to occur on site. These include pallid bat, Townsend's big-eared bat, California mastiff bat, western yellow bat, California leaf-nosed bat, big free-tailed bat, and pocketed free-tailed bat (Table 3.4-2).

The special-status bats of the local area roost in rock crevices, tunnels, or caves; one species (western yellow bat) roosts in the foliage of riparian trees. California leaf-nosed bat has been recorded roosting at various mines in the Eagle Mountains to the northwest (CNDDB 2011), and

several other common and special-status bats likely roost there as well. Roost sites may be used seasonally (e.g., inactive cool seasons) or daily (day roosts, used during inactive daylight hours). Maternity roosts are particularly important overall for bat life histories.

Knowledge of bat distribution and occurrences is sparse. The majority of adverse impacts to bat populations in the region result from disturbance of roosting or hibernation sites, especially where large numbers of bats congregate; physical closures of old mine shafts, which eliminates roosting habitat; elimination of riparian or desert wash microphyll vegetation which is often productive foraging habitat; more general habitat loss or land use conversion; and agricultural pesticide use which may poison bats or eliminate their prey-base. Bat life histories vary widely. Some species hibernate during winter, or migrate south. During the breeding season, bats generally roost during the day, either alone or in communal roost sites, depending on species. All special-status bats in the region are insectivorous, catching their prey either on the wing or on the ground. Some species feed mainly over open water where insect production is especially high, but others forage over open shrublands such as found on the solar facility site and along the gen-tie alternative alignments.

While the project site supports foraging habitat for bats, large roosting colonies are not likely to occur because the site does not support typical roosting habitat for most bats, especially colonial species.

Palm Springs Round-Tailed Ground Squirrel (Xerospermophilus tereticaudus chlorus)

Palm Springs round-tailed ground squirrel (also called Coachella Valley round-tailed ground squirrel) is a CDFG Species of Special Concern and a BLM Sensitive Species, and was a candidate for federal listing as threatened or endangered prior to 2010, when it was removed from the list of candidates (USFWS 2010b). Until recently, it was believed to be limited in range to the Coachella Valley region. Within that area, its primary habitat is mesquite (*Prosopis glandulosa*) hummocks and associated sand dunes and, to a lesser extent, dunes and hummocks associated with creosote bush or other vegetation. The primary threats to its habitat are land use changes and groundwater pumping, both of which have eliminated much of the honey mesquite from the Coachella Valley area. Recent research indicates that its range is substantially larger than previously understood, extending at least 150 miles northward to Hinkley Valley and Death Valley. Based on this range extension, the existing protection on its habitat in Death Valley National Park, and ongoing conservation efforts in the Coachella Valley, the USFWS concludes that it no longer warrants candidate status.

Palm Springs round-tailed ground squirrel was reported near gen-tie Alternatives B and C in the DSSF EIS and CDCA Plan Amendment (BLM 2011b), and a round-tailed ground squirrel (subspecies unknown) was observed on the proposed solar generation facility site during desert tortoises surveys. Habitat on the proposed solar facility site and gen-tie Alternatives B, C, and D is marginally suitable, but lacks the aeolian sands and mesquite hummocks that characterize the squirrel's primary habitat. Gen-tie Alternative E crosses suitable habitat over a portion of its length but was not observed on the alignment during field surveys in spring 2012. Based on the foregoing, Palm Springs round-tailed ground squirrel may occur in low numbers on the solar facility site or gen-tie alternatives, but primary habitat would only be intersected by Alternative E over the portion of its length crossing aeolian sands.

American Badger (Taxidea taxus)

American badger is designated as a Species of Special Concern by CDFG. It is a now uncommon, permanent resident throughout most of the state, including the Colorado Desert. Badger numbers have declined drastically in California in the 20th century due largely to agricultural and urban development, direct and secondary poisoning, and shooting and trapping for control (Bolster 1998), though these factors probably have not been important threats to badgers in the Colorado Desert. They are found in open shrubland, forest, and herbaceous habitats with friable soils. In the southwest, badgers are typically associated with creosote bush and sagebrush shrublands. Badgers are fossorial, digging large burrows in dry, friable soils and will use multiple dens/cover burrows within their home range, which they move among daily, although they can use a den for a few days at a time (Western et al. 2010). Badger home range sizes are dependent upon prey availability and other habitat characteristics. In general, home ranges are several hundred acres in size, though they would likely be larger in the Colorado Desert due to low prey densities. American badger dens were recorded on the proposed solar facility site during surveys, and suitable desert scrub habitat is present throughout the project study area, including the gen-tie alternative alignments.

Desert Kit Fox (Vulpes macrotis arsipus)

The desert kit fox can be found in much of the same habitats as the badger. Desert kit fox is not listed as a special-status species by the State of California or the USFWS, but it is protected under Title 14, Section 460, California Code of Regulations, which prohibits take. This summary of kit fox biology is based on Cypher (2003). Kit foxes are primarily nocturnal, and inhabit open level areas with patchy shrubs. Friable soils are necessary for the construction of dens, which are used throughout the year for cover, thermoregulation, water conservation, and rearing pups. Their home ranges vary but average about 1,100 ha (2,700 acres) in California deserts. They are not strongly territorial and home ranges can overlap. Desert kit fox pairs and young may use one or several active den complexes. Pairs raise one litter of about four pups per year, born between late January and March. The pups emerge from the natal den four weeks after birth and begin to forage with the parents at age three to four months. In early 2012, an outbreak of canine distemper virus was discovered in desert kit fox populations in eastern Riverside County, including the immediate vicinity of the proposed DHSP site (M. Massar and M. Rodriguez, pers. comm. with Scott D. White, March 2012). The CDFG is currently assessing the extent of the outbreak and developing strategies for desert kit fox management to address the distemper outbreak and the habitat impacts of renewable energy projects. Numerous desert kit fox burrows were recorded in the proposed solar facility site and on gen-tie alignment Alternative E, and suitable habitat occurs throughout the project study area, including all the gen-tie alternative alignments.

Burro Deer (Odocoileus hemionus eremicus)

The burro deer (also known as the desert mule deer) is a subspecies of mule deer endemic to southeastern California, through southern Arizona and New Mexico, and desert regions of mainland Mexico. Burro deer eat foliage from various riparian and microphyll woodland trees, such as willow, palo verde, and ironwood. Various other shrubs complete the diet depending on the season (BLM and CDFG 2002).

Burro deer tend to have larger home ranges than mule deer in other areas, probably because their desert habitat produces less food. Their home ranges contract during summer, likely because the deer must remain fairly near dependable water sources. Their habitats include desert mountain ranges, bajadas, and flats. The mountainous areas provide favored fawning habitat and more reliable water sources (springs and bedrock sinks) than the flats (Western et al. 2010). Further, montane vegetation provides greater nutritional value than creosote scrub on the flats and bajadas. Dense vegetation is an important habitat element year round for shaded cover and protection from predators (Western et al. 2010).

Burro deer require drinking water and generally drink daily during summer. Thus their summer range is largely limited to areas within a few kilometers of water sources. The proposed solar facility site is on a bajada where burro deer may range during cool seasons, but it provides no onsite water supply, nor is it near enough to a surface water source for regular warm-season foraging. Vegetation on the site is generally open, and no suitable dense thickets for shaded escape cover are available. Thus, the solar facility site is unlikely to serve as important burro deer habitat. However, burro deer are likely to use habitat on the site intermittently during winter, especially as a movement corridor among regional mountain ranges. Tracks of an unidentified ungulate (burro deer or Nelson's bighorn sheep) were noted on the proposed solar facility site during field surveys.

Yuma Mountain Lion (Felis concolor browni)

The Yuma mountain lion is recognized by CDFG as a Species of Special Concern (CDFG 2011). Interpretations of its geographic range vary, but by any account it is limited to the Sonoran Desert in southern California and perhaps east into Arizona and south into Mexico (Bolster 1998). The Yuma mountain lion's life history is poorly documented. It is known largely from the bottomlands and foothills of the Colorado River Valley. Its principal prey is burro deer and bighorn sheep, and its range and habitat generally coincide with theirs (Bolster 1998).

There is some concern that the Colorado Desert region may not support a viable mountain lion population, and that lions found in the eastern low desert have dispersed there from surrounding areas. Habitat loss is a serious concern for Yuma mountain lion, for two reasons. First, declining habitat availability and increasing habitat fragmentation affect its long-term population viability. Second, as habitat loss and fragmentation affect burro deer and bighorn sheep, any reduction of the available prey could lead to an insufficient prey base for a viable mountain lion population (Bolster 1998).

The proposed solar facility site is unlikely to serve as important Yuma mountain lion habitat given that it does not provide viable habitat for burro deer or bighorn sheep. However, mountain lions may use habitat on the site intermittently during winter, especially as a movement corridor among regional mountain ranges.

Nelson's Bighorn Sheep (Ovis canadensis nelsoni)

Nelson's bighorn sheep is known from the Transverse Ranges, California Desert Ranges, Nevada, northern Arizona, and Utah. Its populations in the Peninsular Ranges (the Santa Rosa and San Jacinto Mountains, and southward into Baja California) are federally listed as a threatened distinct vertebrate population segment. However, populations in eastern Riverside County have no CESA or ESA listing status. It is a BLM Sensitive Species and, except where designated

otherwise by CDFG, is fully protected under the state Fish and Game Code. Threats to Nelson's bighorn sheep include habitat loss or degradation, limited availability of water sources, barriers to local or regional movement (e.g., highways and aqueducts), disease spread by domestic livestock, and natural predation by mountain lions in some populations. Current and/or historic populations occur in the mountain ranges in the general region surrounding the proposed solar facility site and gen-tie alternative alignments, including the Eagle, Coxcomb, Chuckwalla, Granite, and Northern Palen Mountains (CNDDB 2011). Nelson's bighorn sheep are likely to use habitat on the site intermittently during winter, especially as a movement corridor among regional mountain ranges. As noted above, tracks of an unidentified ungulate (burro deer or Nelson's bighorn sheep) were observed on the proposed solar facility site during field surveys.

3.4.6 Wildlife Movement

The extent, distribution, and accessibility of suitable habitat affect the long-term viability of regional wildlife populations. Fragmentation and isolation of natural habitat ultimately results in the loss of vulnerable native species within those areas. Accessibility between habitat areas, i.e., "connectivity," is important to long-term genetic diversity and demography of wildlife populations. In the short term, connectivity may also be important to individual animals' ability to occupy their home ranges, if their ranges extend across a potential movement barrier. These considerations apply to greater or lesser extent to all plants and animals. Plant populations "move" over the course of generations via pollen and seed dispersal; most birds and insects travel and disperse via flight; terrestrial species including small mammals, reptiles, arid land amphibians, and non-flying invertebrates disperse across land. Therefore, landscape barriers and impediments are more important considerations for movement of these terrestrial species. These considerations are especially important for rare, threatened, or endangered species such as the desert tortoise and large mammals, which tend to be wide-ranging and exist in lower population densities. Therefore, this discussion of wildlife movement in the project study area focuses on desert tortoise and Nelson's bighorn sheep, though it is also applicable to a wide variety of other species.

The potential for movement constraints is also relevant for other species, including corridor "passage" and corridor "dweller" species (Beier and Loe 1992). Corridor passage species would traverse connectivity areas during ordinary diurnal or seasonal movement patterns, whereas corridor dweller species must persist as viable populations over multiple generations within a connectivity area in order to eventually migrate from one habitat block to another. For example, Pinto Wash, which the Colorado River Aqueduct crosses north of the project site, and links to upper bajada habitat at the base of the Eagle Mountains west of the site, appears to be an important linkage between desert tortoise populations in the Colorado and Mojave Deserts (USFWS 2011b). Pinto Wash also spreads into a braided channel system on the upper bajada east of the site, at the bases of the Coxcomb Mountains, though there is relatively little quality desert tortoise habitat to the east and southeast (Nussear et al. 2009).

In landscapes where native habitats exist as partially isolated patches surrounded by other land uses, planning for wildlife movement generally focuses on "wildlife corridors" to provide animals with access routes among habitat patches. In largely undeveloped areas, including the Chuckwalla Valley, wildlife habitat is available in extensive open space areas throughout much of the region, but specific barriers may impede or prevent movement. In these landscapes, wildlife movement planning focuses on specific sites where animals can cross linear barriers (e.g.,

wash crossings beneath Interstate 10), and on broader linkage areas that may support stable, long-term populations of target species.

In the Chuckwalla Valley, the biologically important functions of large mammal movement are the long-term demographic and genetic effects of occasional animal movement among mountain ranges and other large habitat areas. Animals such as Nelson's bighorn sheep may travel across the valley infrequently, as a part of dispersal among subpopulations. Animals may also use bajada habitat, including habitat on the proposed solar facility site, for seasonal foraging, as part of their regular home ranges. These large animals are examples of corridor "passage" species. In contrast to large animal movement, desert tortoises and other less-mobile animals may live out their entire lives within a linkage area between larger habitat blocks; for these species, movement among mountain ranges may take place over the course of several generations (Beier and Loe 1992). The USFWS (2011b) recommends maintaining large areas of occupied desert tortoise habitat in important linkage areas, including the upper Chuckwalla Valley. Within these linkage areas, desert tortoises should be "dweller" species.

A state-wide evaluation of habitat connectivity (Spencer et al. 2010) includes the upper Chuckwalla Valley, including the DHSP site, among areas identified as "Essential Connectivity Areas." The report describes these as follows: "Essential Connectivity Areas are placeholder polygons that can inform land-planning efforts, but that should eventually be replaced by more detailed Linkage Designs, developed at finer resolution based on the needs of particular species and ecological processes" (p. xiii). In Chapters 4 and 5, Spencer et al. (2010) provide "frameworks" for regional and local scale connectivity analysis. Following these recommendations, BLM contracted researchers involved in the state-wide evaluation to conduct regional and local analyses across the desert, including this area. Preliminary results indicate that the critical connectivity area lies to the west of the proposed solar facility and gen-tie alternatives (Fesnock pers com).

BLM management strategies for wildlife and habitat, including management to maintain connectivity among habitat areas, include special management of ACECs, Wilderness Areas, Wilderness Study Areas, WHMAs and DWMAs. Certain BLM lands within the Chuckwalla Valley and near the project area are designated as ACECs, WHMAs, and DWMAs (Figure 3.4-1 in Appendix A). Extensive natural habitat areas within JTNP, north of the project site, are also important to regional wildlife habitat connectivity.

The Chuckwalla Valley is bordered on the south by the Chuckwalla Mountains, south of the I-10; and on the north by the Eagle Mountains and Coxcomb Mountains, both within JTNP, north of the Colorado River Aqueduct (Figure 3.4-3 in Appendix A). Opportunity for wildlife movement among these mountain ranges is significantly impeded by Interstate 10 and the aqueduct. A few other existing linear features (paved roads, the disused Kaiser rail line, unpaved roads, transmission line and pipeline access roads parallel to the freeway) have only minimal effects on wildlife movement. Non-linear impediments to wildlife movement include residential land uses around Lake Tamarisk and Eagle Mountain; the closed Eagle Mountain quarry and associated overburden deposits, evaporation ponds, and other facilities; and the active and disused agricultural lands throughout the valley. In addition, the first phase (Phase 1A) of construction of the DSSF project is currently fenced and serves as a barrier to wildlife movement. The fenced portion includes an area of approximately 500 acres extending east from Kaiser Road 0.7 miles along the northern boundary of the proposed solar facility site. Even with these impediments to biological connectivity, there is opportunity for both corridor "passage" and "dweller" wildlife species to

move through the area, via washes and culverts beneath the I-10 Freeway, siphon sites along the aqueduct, and remaining open space areas. Movement opportunity varies for each species, depending on motility and behavioral constraints, as well as landscape impediments.

Some species, such as coyote, may learn to cross the freeway safely. But for most terrestrial species the freeway presents an impassable or high-risk barrier to north-south movement. There are potential wildlife crossings beneath the freeway at scattered wash crossings (e.g., box culverts) and at the underpasses at Desert Center Road and Eagle Mountain Road. In some cases, these crossings are accessible to most terrestrial wildlife species. In other cases, soil on the downstream sides has eroded away, leaving vertical steps of about 2 feet, which would not be accessible to desert tortoises or many other reptiles and small mammals. Also, while the crossings are large enough for physical access to any species, specific behavioral adaptations affect the likelihood that any given species would use them. Mountain lions or coyotes would likely cross through the culverts routinely, but deer and bighorn sheep may avoid culverts if they appear to present predation risk.

The portions of the aqueduct where water flows in an uncovered surface canal present an impassable barrier, except at periodic "siphon" points, where desert washes cross over the aqueduct. At these crossings, aqueduct water is carried underground through U-shaped siphons over distances of several hundred feet or more. Figure 3.4-3 in Appendix A indicates the locations of potential wildlife crossings along the freeway and aqueduct. Burro deer have been documented crossing similar aqueduct siphons in Arizona (Tull and Krausman 2001).

The proposed solar facility site is located roughly midway between the three mountain ranges that surround the upper Chuckwalla Valley. It is adjacent to a small (approximately 40-acre) date palm orchard near its southeastern corner; about 1 mile north of agricultural lands on about 1,000 acres; and about 0.25 miles west of another large agricultural tract, also covering about 1,000 acres. These agricultural lands would likely be passable to "corridor passage" species, such as large mammals. Disused agricultural lands may also be suitable for some "dweller" species, including small mammals and reptiles, but they are generally poorly suited for desert tortoises. Due to the poor quality of habitat on the proposed solar facility site, the fragmented and disturbed landscape surrounding the site, and the low tortoise sign observed on the site, this area would not be considered suitable for tortoise "dwelling" in high enough densities to support generational connectivity among tortoises, and therefore would be of minimal value to support regional connectivity.

3.5 CLIMATE CHANGE

This section describes the environmental and regulatory settings associated with the construction and operation of the Proposed Action and its alternatives with respect to climate change in the project study area. The project study area for climate change includes the natural and anthropogenic drivers of global climate change and the increasing world-wide greenhouse gas (GHG) emissions from human activities during the industrial era.

Climate is the generalization of weather conditions for a region throughout the year and averaged over a series of years. Climate descriptions typically emphasize average, maximum, and minimum conditions for temperature and precipitation patterns, but also include wind, cloud cover, humidity, and sunlight intensity patterns.

Changes in climate conditions occur over a wide range of time scales. Climate change over time scales of tens of thousands to hundreds of thousands of years or longer are produced by natural factors such as:

- Continental drift and associated changes in ocean circulation patterns, with resulting changes to atmospheric circulation patterns and weather conditions;
- Continental uplift and tectonic activity forming mountain ranges and plateaus that alter atmospheric circulation patterns and weather conditions over land areas; and
- Variations in the shape of Earth's orbit around the sun and variations in the tilt of the Earth's axis, affecting the intensity of sunlight received at different locations.

Climate change over shorter time scales is produced by natural factors such as:

- Variations in the sun's output of solar radiation;
- Volcanic eruptions releasing large quantities of carbon dioxide (CO_2), sulfur compounds, and aerosols;
- Periodic changes in ocean circulation patterns and sea surface temperatures, which influence global weather patterns;
- Changes in the extent of snow and ice cover; and
- Other changes in land surface properties affecting the absorption and reflection of solar radiation.

Increases in the atmospheric concentrations of CO_2, methane (CH_4), nitrous oxide (N_2O), and other GHGs over the last 250 years are due largely to human activities, such as:

- Fossil fuel use;
- The effects of land use change on plant and soil carbon;
- Ruminant animals, agriculture, and biomass burning;
- Use of atmospheric halocarbons and industrial fluorinated gases;
- Generating solid and liquid aerosol air pollutants; and
- Changes in land surface properties affecting the absorption and reflection of solar radiation.

Greenhouse Gases

Greenhouse gases are compounds in the atmosphere that absorb infrared radiation and re-radiate a portion of that back toward the earth's surface, thus trapping heat and warming the earth's atmosphere. The most important GHG pollutants are CO_2, methane (CH_4), and nitrous oxide (N_2O), because these GHG emissions are the most common and dominate the global warming potential of anthropogenic emissions. These are produced naturally by respiration and other physiological processes of plants, animals, and microorganisms; by decomposition of organic matter; by volcanic and geothermal activity; by naturally occurring wildfires; and by natural chemical reactions in soil and water. Other GHG pollutants are not as long-lived. For example, ozone is chemically very reactive, and high concentrations do not persist for long periods of time in the lower atmosphere, reducing the overall climate effects this pollutant in the lower atmosphere.

Although naturally present in the atmosphere, concentrations of CO_2, CH_4, and N_2O also are affected by emissions from industrial processes, transportation technology, urban development, agricultural practices, and other human activity. The Intergovernmental Panel on Climate Change (IPCC) and the National Oceanic and Atmospheric Administration (NOAA) estimate the following changes in global atmospheric concentrations of the most important GHGs (IPCC 2001, 2007; NOAA 2010):

- Atmospheric concentrations of CO_2 have risen from a pre-industrial background of 280 parts per million by volume (ppm) to 379 ppm in 2005 and to 386 ppm in 2009;
- Atmospheric concentrations of CH_4 have risen from a pre-industrial background of about 0.70 ppm to 1.774 ppm in 2005 and to 1.79 ppm in 2009; and
- Atmospheric concentrations of N_2O have risen from a pre-industrial background of 0.270 ppm to 0.319 ppm in 2005 and to 0.322 ppm in 2009.

The IPCC has concluded that these changes in atmospheric composition are almost entirely the result of human activity, not the result of changes in natural processes that produce or remove these gases (IPCC 2007).

CO_2, CH_4, and N_2O have atmospheric residence times ranging from about a decade to more than a century. Several other important GHG compounds with long atmospheric residence times are produced almost entirely by industrial processes; these include sulfur hexafluoride (SF_6) and a wide range of fluorinated hydrocarbons. These fluorinated compounds typically have atmospheric residence times ranging from a few decades to thousands of years.

The overall global warming potential of GHG emissions is typically presented in terms of carbon dioxide equivalents (CO2e), using equivalency factors developed by the IPCC. The IPCC has published sets of CO2e factors as part of its periodic climate change assessment reports issued in 1995, 2001, and 2007. The latest IPCC data assign global warming potential multipliers of 1 to CO_2, 21 to CH_4, and 310 to N_2O (IPCC 2007). The global warming potential multiplier for sulfur hexafluoride (SF_6) is 23,900; global warming potential multipliers for fluorinated hydrocarbons vary widely according to the specific compound.

CARB estimated that the 1990 level of GHG emissions in California was 427 million metric tons CO2e (MMTCO2e) (CARB 2007). Updated inventories show the 1990 level to be 433 MMTCO2e, and the 2008 level of GHG emissions for California was 477.74 MMTCO2e

(CARB 2010a), a 11.9 percent increase over 1990 levels. As a comparison, USEPA estimates that national GHG emissions in 2008 were 7.783 billion metric tons CO2e (USEPA 2010). California thus accounted for 6.1 percent of overall U.S. GHG emissions in 2008. National GHG emissions in 2006 represented a 14.2 percent increase from estimated 1990 national GHG emissions (6.814 billion metric tons CO2e). CARB estimates that without implementation of programs to reduce GHG emissions, statewide GHG emissions in 2020 would be about 596 MMTCO2e, a 39.6 percent increase from 1990 levels (CARB 2008).

Based on the GHG inventory for 2008 (CARB 2010a), the major sources of GHG emissions in California are:

- Fuel combustion for motor vehicle, aircraft, rail, and commercial vessel transportation (36.63%);
- Industrial facility operations and fuel use (19.40%);
- Fuel combustion for electricity generation, both in-state and imported (24.35%);
- Fuel use in commercial and residential buildings (9.03%);
- Recycling and waste management (1.40%);
- High Global Warming Potential (3.28%);
- Agricultural (5.87%); and
- Forestry – wildfire (0.04%).

3.5.1 Regulatory Framework

State and Federal Climate Change Programs

The U.S. Department of the Interior (DOI) has established general policies related to renewable energy development and climate change. In 2001, Secretary Order 3226 established a requirement that each bureau or office within the DOI should consider and analyze potential climate change impacts when undertaking long-range planning, developing multiyear management plans, making major decisions on using resources under the DOI's purview, or setting priorities for scientific research and investigation. In March 2009, Secretary Order 3285 set a policy that encouraging the production, development, and delivery of renewable energy would be one of the DOI's highest priorities. In September 2009, Secretary Order 3289 reaffirmed the provisions of Secretary Order 3226 and established a DOI Carbon Storage Project to develop methods for geological and biological carbon storage. In February 2010, Secretary Order 3289 was replaced with Secretary Order 3289, Amendment 1, which made minor editorial changes to the original order.

The EPA adopted a federal GHG mandatory reporting program in October 2009. The federal GHG mandatory reporting threshold is 25,000 metric tons per year CO2e for 31 categories of stationary emission sources (USEPA 2009). GHG reporting for additional categories of stationary sources may be addressed by future regulations. Electrical power transmission and distribution system is one of the source categories, which remains under review for future federal GHG reporting requirements. Electrical transformers, switchgear, circuit breakers, gas-insulated substations, and gas-insulated transmission lines are a source of sulfur hexafluoride and fluorinated hydrocarbon emissions (mostly from equipment and storage container leaks or from spills and leaks during recharging of insulating gases).

In addition, Executive Order (EO) 13514, "Federal Leadership in Environmental, Energy, and Economic Performance" (Oct. 5, 2009), directs all Federal agencies to inventory, report, and reduce their direct and indirect greenhouse gas (GHG) emissions in three categories: "scope 1" direct emissions from sources owned or controlled by the agencies; "scope 2" indirect emissions that result from the generation of electricity, heat, or steam that the agencies purchase; and "scope 3" indirect emissions from sources that are not owned or directly controlled by the agencies but that relate to their activities (e.g., employee commuting). Starting with a fiscal year (FY) 2008 baseline and a FY 2010 inventory due in 2011, agencies must submit their annual GHG emissions inventories and reports to the Council on Environmental Quality (CEQ) and the Office of Management and Budget (OMB) every January, for the preceding fiscal year. Under current guidance, agencies generally need not report GHG emissions associated with activities they authorize, but those emissions may be voluntarily reported.

California began efforts to address GHG issues at a state level in 1988 when the California Energy Commission (CEC) was directed to develop a statewide inventory of GHG emission sources. The California Climate Action Registry was established in 2000 to allow companies and government agencies to voluntarily record their GHG emissions in a database, in anticipation of possible future regulations that might allow credit for early GHG emission reductions. In 2002, Assembly Bill (AB) 1493 directed CARB to develop regulations to reduce GHG emissions from vehicles sold in California. In 2005, Governor Schwarzenegger issued Executive Order S-3-05, which sets the following target dates for reducing statewide GHG emissions:

- Reduce GHG emissions to 2000 levels by 2010;
- Reduce GHG emissions to 1990 levels by 2020; and
- Reduce GHG emissions to 80 percent below 1990 levels by 2050.

In 2006, Senate Bill (SB) 1368 created GHG performance standards for new long-term financial investments in base-load electricity generation facilities serving California customers. Also in 2006, California passed AB 32 (the California Global Warming Solutions Act of 2006; California Health and Safety Code Division 25.5, Sections 38500, et seq.), which requires CARB to design and implement regulations, emission limits, and other measures to reduce statewide GHG emissions to 1990 levels by 2020.

The California Global Warming Solutions Act of 2006 (AB 32) established the following timetable for specific CARB actions:

- Publish a list of discrete early action GHG emission reduction measures by June 30, 2007.
- Establish a statewide GHG emissions cap for 2020 (equivalent to the 1990 emissions level) by January 1, 2008.
- Adopt mandatory reporting rules for significant sources of GHGs by January 1, 2008.
- Adopt a scoping plan by January 1, 2009, indicating how GHG emission reductions will be achieved from significant GHG sources via regulations, market-based compliance mechanisms and other actions, including identification of a *de minimis* threshold for GHG emissions, below which emission reduction requirements would not apply.

- Adopt regulations by January 1, 2011 to achieve the maximum technologically feasible and cost-effective reductions in GHGs, including provisions for using both market-based and alternative compliance mechanisms.
- Establish January 1, 2012 as the date by which all regulations adopted prior to January 1, 2010 are to become operative (enforceable).
- The goals of the California Global Warming Solutions Act of 2006 are to halt the growth in annual GHG emissions and to reduce GHG emissions to the 1990 level by 2020. Achieving the 2020 goal would represent a 12 percent reduction in statewide GHG emissions from 2006 levels and a 28 percent reduction from projected 2020 "business as usual" emission levels.

In 2007, CARB adopted regulations requiring mandatory annual reporting of GHG emissions from the following categories of industrial emission sources:

- Cement manufacturing plants;
- Electric generating plants, retail providers, and power marketers;
- Cogeneration facilities;
- Petroleum refineries, hydrogen plants, and combustion from oil and gas production; and
- General stationary source fuel combustion.

The GHG reporting requirements (CARB 2010b) establish a reporting threshold of 25,000 metric tons per year of CO_2 emissions for industrial facilities other than power generation and cogeneration facilities. The emission reporting threshold for power generation and cogeneration facilities is 2,500 metric tons per year of CO_2. Power generation and cogeneration facilities with a capacity of less than 1 megawatt, backup and emergency generators, portable equipment, primary and secondary schools, and most hospitals are exempt from the reporting requirements. While the CARB mandatory GHG reporting regulation requires the reporting of all major GHG emissions, the thresholds for requiring the reports are based on CO_2 emissions only, not total CO2e from all GHG emissions. GHG emissions from vehicle fleets also are excluded from the mandatory reporting requirements, but the regulation provides for voluntary reporting of those emissions. Non-exempt facilities with annual CO_2 emissions below the relevant *de minimis* thresholds are not required to report their annual GHG emissions. All facilities subject to the regulation must submit annual GHG emission reports. In addition, depending on type and size of facility, independent verification of annual GHG emission reports must be submitted either annually or every third year.

CARB adopted the climate change scoping plan mandated by AB 32 in December 2008 (CARB 2008). Key elements of the plan include:

- Expanding and strengthening energy efficiency programs, building energy efficiency standards, and appliance energy efficiency standards;
- Achieving a renewables energy mix of 33 percent for statewide electrical power generation;
- Developing a California cap-and-trade program coordinated with other western states to limit industrial GHG emissions;
- Establishing targets for transportation-related GHG emissions by region throughout California and pursuing policies and incentives to achieve those targets;

- Adopting and implementing measures such as California's clean car standards, the low carbon fuel standards, and goods movement measures; and
- Creating targeted fees such as a public goods charge on water use, fees on the use of high global warming potential gases, and a fee to fund the administrative costs of implementing AB 32 programs.

In 2008, SB 375 was adopted to provide a process for regional and local planning efforts to achieve GHG emission reductions through land use and transportation planning programs. SB 375 requires coordination between the regional transportation planning process and the regional housing needs assessment process. SB 375 also modifies the regional housing needs assessment process timelines to be consistent with timelines for regional transportation planning. Under SB 375, CARB will establish transportation-related regional GHG emission reduction targets to be considered in regional transportation planning programs. The regional GHG emission reduction targets are planning goals, not mandatory requirements. Regional planning organizations will be responsible for working with local governments to identify a "sustainable communities strategy" that is based on current planning assumptions, is consistent with federal Clean Air Act requirements, and will help achieve regional GHG emission reduction targets.

Greenhouse Gas Reduction Strategies

Combustion of fossil fuels accounts for most GHG emissions, both in California and nationally. Additional GHG emissions are produced directly by industrial, agricultural, and waste management activities. The importance of fossil fuel combustion as a source of GHG emissions means that energy conservation and fuel economy measures have a major role in reducing GHG emissions. Most potential GHG reduction measures can be grouped into the following general categories:

- GHG emission standards for mobile sources;
- Improved fuel economy for mobile sources;
- Increased use of non-combustion sources for electrical power generation;
- Reduced electrical use in residential, commercial, and industrial buildings;
- Reduced fossil fuel use in residential, commercial, and industrial buildings;
- Land use and transportation programs to reduce vehicle trips and vehicle miles traveled (VMT);
- GHG emission reductions from stationary fuel combustion sources;
- GHG emission reductions from non-combustion sources in industrial operations;
- Development of substitutes for industrial uses of sulfur hexafluoride and fluorinated hydrocarbons;
- Reduced use of nitrogen fertilizers in agriculture and landscape maintenance;
- Improved CH_4 recovery at landfills and wastewater treatment plants; and
- CH_4 recovery at feedlots, dairies, and other livestock operations.

As noted previously, electrical power generation represents an important source of GHG emissions (22 percent of California's GHG emissions). The CEC and the CPUC have implemented two programs focused specifically on generators and retailers of electrical power.

In 2002, SB 1078 established targets for renewable energy use by public and investor-owned utilities in California. The following types of power sources qualify as renewable energy sources under the Renewables Portfolio Standards (RPS) Program:

- Geothermal;
- Wind;
- Solar thermal;
- Photovoltaic solar;
- Small hydroelectric (under 30 megawatts);
- Efficiency improvements for large hydroelectric;
- Conduit hydroelectric;
- Ocean wave;
- Tidal currents;
- Ocean thermal;
- Biomass;
- Digester gas;
- Landfill gas;
- Municipal solid waste; and
- Biodiesel.

The California RPS Program sets fixed performance standards for investor-owned utilities in California and allows publicly owned utilities to set their own standards and target deadlines. The initial RPS target for investor-owned utilities was 20 percent renewable power generation by 2017. In 2006, SB 107 revised the target date for the 20 percent standard to 2010. As noted previously, the CARB climate change scoping plan adopted in 2008 calls for a statewide renewable energy mix of 33 percent by 2020.

In April 2011, Senate Bill 2 of the 1st Extraordinary Session (SB X1-2), also known as the California Renewable Energy Resources Act**,** was signed into law. This law applies the new 33 percent RPS by December 31, 2020 to all retail sellers of electricity. It also established standards for interim years of: an average of 20 percent from 2011 through 2013, a minimum of 20 percent thereafter through 2016, and a minimum of 25 percent by December 31, 2016. This codified the requirement to achieve 33 percent RPS statewide by the end of 2020.

In 2006, SB 1368 established an additional program to limit utility industry investments in power generation sources that have high emissions of GHGs. The SB 1368 program establishes emission performance standards (EPS) for utility investments in baseload power generation facilities. The current EPS is 1,100 pounds of CO_2 per megawatt-hour of energy generation (0.5 metric tons CO_2/MWh). Utility investments subject to the EPS limitation include:

- Construction or purchase of new power plants designed and intended for baseload power generation;
- Purchase of existing power plants that are designed and intended for baseload power generation (combined-cycle natural gas power plants that were in operation or permitted before June 30, 2007, are exempt from this requirement);
- Ownership of shares in existing power plants that are designed and intended for baseload power generation (combined-cycle natural gas power plants that were in operation or permitted before June 30, 2007, are exempt from this requirement);

- Capital investment in existing utility-owned power plants that are designed and intended for baseload power generation if that investment would:
  - Increase generation capacity by 50 megawatts or more at a combined-cycle natural gas power plant that was permitted before June 30, 2007;
  - Extend the life of one or more units at other power plants by five years or more;
  - Increase the rated capacity of other power plants; or
  - Convert a non-baseload power plant into a baseload power plant.

Table 3.5-1 summarizes the current power generation mixes for the major electric utility companies in California.

Table 3.5-1. Current Renewable Procurement Status

Electric Utility Company	2003	2004	2005	2006	2007	2008	2009	2010
PG&E	11.5%	12.2%	12.1%	12.6%	11.8%	12.4%	14.1%	17.7%
SCE	16.6%	18.7%	17.6%	16.6%	15.5%	15.8%	16.8%	19.4%
SDG&E	3.7%	4.5%	5.2%	5.6%	5.2%	6.1%	10.2%	11.9%
Average	13.8%	14.0%	13.7%	13.1%	12.6%	13.0%	15.4%	17.9%

Source: CPUC 2011

3.5.2 Existing Conditions

Existing Greenhouse Gas Emissions

Statewide emissions of GHGs from relevant source categories in 1990 and later years are summarized in Table 3.5-2. Specific contributions from air basins such as MDAB are not currently specified as part of the state inventory. Emissions of CO_2 occur largely from combustion of fossil fuels. The major categories of fossil fuel combustion CO_2 sources can be broken into sectors for energy, industrial process and product use, agriculture and forestry, and waste. The energy sector includes energy industry such as power generation and petroleum refining, manufacturing industries and construction, transportation, and other sub-sectors such as commercial/ institutional and residential energy use.

Table 3.5-2. California Greenhouse Gas Emissions (Million Metric Tons CO2e, MMTCO2e)

Emission Inventory Category	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Energy	386.4	401.8	417.0	414.7	412.7	422.5	414.2	411.56	417.0	413.8
Industrial processes and product use	18.3	25.6	25.6	26.4	27.0	28.0	28.8	29.7	30.0	30.1
Agriculture, forestry, and other land use	19.1	21.8	21.8	24.2	24.5	24.5	24.6	24.9	24.7	24.4
Waste	9.4	8.8	8.9	8.8	8.9	8.9	9.2	9.3	9.2	9.4
Gross emissions	433.3	458.0	473.2	474.2	473.2	483.9	476.7	475.3	480.9	477.7

Source: CARB 2010a.

Potential Effects of Climate Change

In November 2004, the California Climate Action Team (CAT) was formed to assist CARB with the Climate Change Scoping Plan. According to the 2006 CAT Report (CAT 2006), the following climate change effects, based on the IPCC trends, can be expected in California over the next century:

1. A diminishing Sierra snowpack, declining by 70 to 90 percent (70 to 80 percent under the medium emission scenarios and 90 percent under the higher emission scenarios), threatening the State's water supply;
2. Increasing temperatures from 8.0 °F to 10.4 °F under the higher emission scenarios, leading to an increase in the number of days ozone pollution standards are exceeded in most urban areas;
3. Increased vulnerability of forests as a result of pest infestation and increased temperatures; and
4. Increased electricity demand, particularly in the hot summer months.

Potential global warming impacts in California may include a decrease in snowpack, sea level rise, more extreme heat days per year, more high ozone days, increased frequency and intensity of wildfires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts on agriculture, water resources, changes in disease vectors, and changes in habitat and biodiversity. The 2009 California Climate Adaptation Strategy Report (California Natural Resources Agency 2009) illustrates the following climate change effects, based on the State's modeling of various scenarios as part of the 2009 Climate Change Impacts Assessment:

1. By 2050, temperatures are projected to increase by an additional 1.8 to 5.4 °F and by 2100, temperatures are projected to increase between 3.6 to 9 °F.
2. By 2050, overall precipitation is projected to decrease by 12 to 35 percent.
3. By 2050, 12 to 18 inches of sea-level rise is projected and by 2100, 21 to 55 inches (1.4 meters) of sea-level rise is projected.

The 2009 California Climate Adaptation Strategy Report found that in the eastern Riverside County region, temperature changes are projected cause a greater than 60 percent increase in household electricity consumption by 2060.

Ecosystem Carbon Storage

Most of the carbon found in organic matter is ultimately derived from CO_2 removed from the atmosphere by growing plants. Thus living organisms and organic matter in the soil represent a GHG (CO_2) that has been temporarily removed from the atmosphere. In addition to carbon stored in organic matter, atmospheric CO_2 can be stored in soils as carbonate minerals formed by chemical or biochemical reactions between CO_2 and calcium or magnesium oxide. The carbon stored in organic matter can be released back into the atmosphere by combustion (wildfires or use of organic matter as fuel); decay of organic matter; and respiration by plants, animals, and microorganism. Carbon stored in carbonate minerals can also be released back into the atmosphere by various chemical reactions.

Long term storage of carbon in terrestrial ecosystems occurs through one of three mechanisms:

- Long term, ongoing increases in biomass (primarily in vegetation biomass);
- Long term, ongoing increases in soil organic matter content; or
- Long-term, ongoing increases in mineralized carbon compounds, primarily as carbonate minerals in the soil.

Desert areas have low vegetation and animal biomass (combined aboveground and below ground), limited quantities of organic litter on the soil surface, and low soil organic matter contents (Oak Ridge National Laboratory 1998a, 1998b). Consequently, desert ecosystems have a low capacity for organic matter carbon storage that could buffer climate change effects due to increasing GHG concentrations.

A few recent studies, such as Wohlfahrt et al. (2008) claim that desert ecosystems may rival temperate forests or grasslands as a potential source of carbon storage. The Wohlfahrt et al. (2008) study was conducted over a 2-year period (2005 and 2006) at a site north of Las Vegas, Nevada, of which vegetation is generally similar to that found at the project site. The study estimated net annual uptake rates of 910 and 981 pounds of carbon per acre per year in 2005 and 2006 with an uncertainty of 65 percent. The study also estimated carbon uptake rates for soil biological crust biomass to be about 1,900 pounds per acre dry weight of biomass in 2005 and 2,050 pounds per acre dry weight of biomass in 2006.

A news review (Stone 2008) noted suggestions from a similar study in China that the estimated carbon storage was occurring as mineralized carbon in the soil rather than as biomass increases. Other researchers interviewed for the news review were dubious about the results reported in both the China study and in Wohlfahrt, et al. (2008).

The recognized mechanisms for carbonate mineral accumulation in soils include chemical formation through the weathering of silicate and oxide minerals, wet deposition of calcium carbonate dissolved in precipitation, and dry deposition of atmospheric dust particles rich in calcium carbonate (McAuliffe 2011). Non-biological mechanisms for CO_2 transport from the atmosphere to soils are dominated by formation of carbonic acid as CO_2 dissolves in water. Precipitation amounts in desert ecosystems are far too low to provide an important mechanism for CO_2 removal from the atmosphere. While carbonic acid in precipitation plays a role in the chemical reactions that occur during weathering of silicate and oxide minerals in rocks, the process is extremely slow. In addition, carbonic acid dissolves calcium carbonate, leaching it to deeper layers in the soil or into groundwater systems. This process keeps calcium carbonate from accumulating in upper soil layers in regions that receive abundant precipitation. Relatively high levels of calcium carbonate are common in desert soils because there is insufficient precipitation to dissolve and leach carbonate minerals from surface soils.

If the carbon uptake estimates made by Wohlfahrt, et al. (2008) occurred as mineralization of atmospheric CO_2 to calcium carbonate, the estimated carbon uptake rates would have added 7,583 pounds of calcium carbonate per acre during 2005 and 8,178 pounds of calcium carbonate per acre during 2006. Such rapid accumulations of calcium carbonate in soils would quickly cement the soils and make them unsuitable for the growth of many, if not most, desert plant species. Therefore, based on a critical review of Wohlfahrt et al., it is expected that desert ecosystems have a low capacity for organic matter carbon storage or buffering climate change.

3.6 CULTURAL RESOURCES

Cultural resources are categorized as buildings, sites, structures, objects, and districts under both federal law [for the purposes of the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA)] and under California state law [for the purposes of the California Environmental Quality Act (CEQA)]. Three kinds of cultural resources, classified by their origins, are considered in this assessment: prehistoric, ethnographic, and historic.

Prehistoric archaeological resources are associated with the human occupation and use of California prior to prolonged European contact. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans settled in California.

Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource-collecting areas, ceremonial sites, value-imbued landscape features, cemeteries, shrines, or ethnic neighborhoods and structures.

Historic-period resources, both archaeological and architectural, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes.

Under federal and state historic preservation law, cultural resources must be at least 50 years old to have sufficient historical importance to merit consideration of eligibility for listing in the National Register of Historic Places (NRHP) or in the California Register of Historical Resources (CRHR). A resource less than 50 years of age must be of exceptional historical importance to be considered for listing.

This section analyzes direct, indirect, and cumulative impacts to cultural resources. The current analysis is based on draft cultural resource assessments conducted by Chambers Group (Akyüz 2012a) and Applied Earthworks (Goldberg and McDougall 2012), an updated cultural resource assessment conducted jointly by Chambers Group and Applied Earthworks (Akyüz 2012b), an indirect and cumulative effects assessment (Smallwood et al. 2012), and BLM's determinations of eligibility and findings of effect (Kalish 2012) for the DHSP. These studies present an overview of previous cultural finds in the project vicinity and the results of field studies of the solar facility site and all portions of Alternative B and Alternative C. There are 98.3 acres of Alternative D (43.5% of the alternative, 3.9% of the total project area) located on private land which remain unsurveyed, and 7.04 acres of Alternative E (2.8% of the alternative, less than 1% of the total project area). In addition, this section relies upon three cultural resources assessments conducted by ECORP for the Desert Sunlight Solar Farm (DSSF) project, which describes fieldwork conducted at their solar field site and on portions of Alternatives B, C, and D and is incorporated by reference in Section 1.11 (Chandler et al. 2010, 2011; Chandler 2012).

3.6.1 Applicable Plans, Policies, and Regulations

Federal

There are numerous federal regulations, executive orders, and policies that direct management of cultural resources on federal lands and by federal agencies. These include the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act (ARPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the American Indian Religious Freedom Act (AIRFA), Executive Order 13007, and the Antiquities Act. For the Bureau of Land Management (BLM) in particular, the Federal Land Policy and Management Act (FLPMA) and several sections of BLM Manuals are relevant as well. The following is a discussion of the most pertinent laws affecting the DHSP and the impact analysis included in the Final EIS and Plan Amendment.

The principal federal law addressing cultural resources is the NHPA of 1966, as amended (16 United States Code [USC], Section 470), and its implementing regulations (36 Code of Federal Regulations [CFR], Part 800), that primarily address compliance with Section 106 of the act. Section 106 of the act requires that Federal agencies take into account the effect of any undertaking on historic properties, and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The implementing regulations describe the process for identifying and evaluating historic properties, for assessing the effects of federal actions on historic properties, and for consulting with interested parties, including the State Historic Preservation Office (SHPO), Indian tribes, local governments, and the public to develop measures that would avoid, reduce, or minimize adverse effects to historic properties. The results of this consultation are presented in Chapter 5. The term "historic properties" refers to cultural resources that are listed on, or meet specific criteria of eligibility for listing on, the National Register of Historic Places. These criteria consist of the quality of significance in American history, architecture, archeology, engineering, and culture present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of persons significant in our past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded, or may be likely to yield, information important in prehistory or history.

Archaeological Resources Protection Act of 1979 (ARPA) (16 USC 470aa et seq.) protects archaeological resources from vandalism and unauthorized collecting on public and Indian lands.

Requirements for responding to discoveries of Native American human remains and associated funerary objects on federal land are addressed under the NAGPRA (Public Law 101-601) and its implementing regulations found at Title 43 CFR Part 10. For those portions of the proposed project or alternative on public land, the BLM will comply with the law and regulations by deter-

mining lineal descendants and culturally affiliated Indian tribes and by carrying out appropriate treatment and disposition of any discovered remains, including transfer of custody.

The American Indian Religious Freedom Act of 1978 (AIRFA) (Title 42, U.S. Code, Section 1996) establishes policy of respect and protection of Native American religious practices. It seeks to correct federal policies and practices that could (a) deny access to sacred sites required in traditional religions, (b) prohibit use and possession of sacred objects necessary for religious ceremonies, and (c) intrude upon or interfere with religious ceremonies. The BLM complies with AIRFA by obtaining and considering the views of traditional religious practitioners as part of the NEPA compliance process.

Executive Order 13007 directs federal agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners. It requires federal agencies to avoid adversely affecting the physical integrity of sacred sites to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions. EO 13007 reinforces the purposes expressed in AIRFA. The BLM complies with EO 13007 by consulting with tribal governments and Indian religious practitioners as part of the NEPA compliance process.

The Antiquities Act of 1906 [16 United States Code (USC) 431–433] establishes criminal penalties for unauthorized destruction or appropriation of "any historic or prehistoric ruin or monument, or any object of antiquity" on federal land; empowers the President to establish historical monuments and landmarks.

The Federal Land Policy and Management Act (FLPMA) establishes policy and goals to be followed in the administration of public lands by the BLM. The intent of FLPMA is to protect and administer public lands within the framework of a program of multiple-use and sustained yield, and the maintenance of environmental quality. Particular emphasis is placed on the protection of the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resources and archaeological values.

Directives for land use planning in the BLM Land Use Planning Manual H-1601-1 and BLM Manual Sections 8110.4 and 8130 require categorizing known and suspected cultural resources according to their nature and relative preservation value. Resource types are allocated to appropriate use categories that include scientific use, conservation for future use, traditional use, public use, and experimental use or those resources discharged from management. These directives also require identifying priority geographic areas for new field inventory or protective measures. These decisions would be based on a probability for unrecorded significant resources, imminent threats from natural or human-caused deterioration, or potential conflict with other resource uses.

A Memorandum of Agreement (MOA) is being developed for this project for the purpose of NHPA compliance. The MOA would be among the BLM, SHPO, EDF Renewables, and interested Indian tribes. The Advisory Council on Historic Preservation would be invited to participate. The MOA will include a list of historic properties located within the APE, require that a Historic Property Treatment Plan be developed and implemented prior to the issuance of a Notice to Proceed, provide for review by interested parties of draft documents resulting from implementation of the Historic Property Treatment Plan, provide for the management of unanticipated discoveries of cultural resources, address treatment of Native American human remains, and include reporting requirements. In addition, the MOA provides a phased approach to the identification and evaluation where access to private land to conduct archaeological surveys has

not been granted. NRHP eligibility evaluations and treatment of historic properties would be carried out before project construction. Once the MOA is signed, which will be before the Record of Decision (ROD) for this EIS is signed, compliance with Section 106 of the NHPA will be considered complete (Kalish 2012).

State

There are numerous state regulations and policies that direct management of cultural resources on state lands and by state agencies. The following is a discussion of the most pertinent laws affecting the DHSP and impact analysis from a state perspective.

Under CEQA, cultural resources listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR) or a local register meet the CEQA definition of "historical resources" and must be given consideration in the CEQA process. For this Draft EIS and Plan Amendment, effects on historical resources may be considered impacts of the Proposed Action. Under CCR, Title 14, Chapter 11.5, properties listed on or formally determined to be eligible for listing in the NRHP are automatically eligible for listing in the CRHR. A resource is generally considered to be historically significant under CEQA if it meets the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old, a resource must meet at least one (and may meet more than one) of the following four criteria:

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association.

Public Resources Code (PRC), Section 5097.98(b) and (e) requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely Descendants (MLD) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to re-inter the remains elsewhere on the property in a location not subject to further disturbance. Section 5097.99 establishes as a felony the acquisition, possession, sale, or dissection with malice or wantonness Native American remains or funerary artifacts. Finally, Section 5097.991 establishes as state policy the repatriation of Native American remains and funerary artifacts.

Health and Safety Code (HSC), Section 7050 makes it a misdemeanor to mutilate, disinter, wantonly disturb, or willfully remove human remains found outside a cemetery and further requires a project owner to halt construction if human remains are discovered and to contact the county coroner.

Riverside County

The following policies outlined in the Riverside County General Plan address cultural resources:

OS 19.2 Review all proposed development for the possibility of archaeological sensitivity.

OS 19.3 Employ procedures to protect the confidentiality and prevent inappropriate public exposure of sensitive archaeological resources when soliciting the assistance of public and volunteer organizations.

OS 19.4 Require a Native American Statement as part of the environmental review process on development projects with identified cultural resources.

The following policies pertain to historical resources:

OS 19.5 Transmit significant development proposals to the History Division of the Riverside County Regional Park and Open-Space District for evaluation in relation to the destruction/preservation of potential historical sites. Prior to approval of any development proposal, feasible mitigation shall be incorporated into the design of the project and its conditions of approval.

OS 19.6 Enforce the Historic Building Code so that historical buildings can be preserved and used without posing a hazard to public safety.

OS 19.7 When possible, allocate resources and/or tax credits to prioritize retrofit of County historic structures, which are irreplaceable.

3.6.2 Existing Conditions

Information provided regarding the setting of the DHSP places it in its geographical and geological context. Additionally, the prehistoric, ethnographic, and historical background provides the context for the evaluation of the NRHP and CRHR eligibility of any identified cultural resources within the Area of Potential Effects (APE) for the DHSP.

Regional Setting

The proposed DHSP site is located in eastern Riverside County within the central Chuckwalla Valley, an east-southeast-trending valley in California's Mojave Desert Geomorphic Province. This province is characterized by east-west-trending ranges separated by desert valleys with enclosed drainages and dry lakes. DHSP is located within the Chuckwalla Valley, which is bounded on the west by the Eagle Mountains, on the east by the Palen Mountains, and to the north by the Coxcomb Mountains. The Chuckwalla Mountains are to the south. The elevation of Chuckwalla Valley ranges from under 400 feet at its lowest point to 1,800 feet along the valley flanks. The surrounding mountains reach between 3,000 and 5,000 feet in elevation. This area receives an average of 5 inches of rain per year. The site is located near the transition between the Mojave and Colorado Deserts.

Environment

Identifying the kinds and distribution of resources necessary to sustain human life in an environment, and the changes in that environment over time is central to understanding whether and how an area was used during prehistory and history. During the time that humans have lived in California, the Mojave Desert has undergone several climatic shifts. These shifts have resulted in

variable availability of vital resources, and that variability has influenced the scope and scale of human use of the vicinity of the DHSP site. Consequently, it is important to consider the historical character of local climate change, or the paleoclimate, and the effects of the paleoclimate on the physical development of the area and its ecology.

Studies of pack-rat middens and lake-level studies have provided a picture of the paleoclimate and paleoecology of the Mojave and Colorado Deserts. During prehistoric times, this region fluctuated between cool-and-moist and warm-and-dry periods. These fluctuations in temperature and moisture were crucial to the human occupation of the region. Environmental changes also had important implications for the DHSP vicinity specifically, because of the proximity of Palen Lake. During cool, wet times the regional lakes filled and the necessary resources for human occupation were available. During warm, dry times the lakes dried and the region became a difficult place to live and traverse.

Geology

The geological formations in the proposed project vicinity are varied. Quaternary lake deposits of Ford, Palen, and Hayfield dry lakes lie in the lowest portions of Chuckwalla Valley. Ford and Palen dry lakes are bordered by extensive areas covered by Quaternary dune sand. Around these areas and throughout the other valleys, lies Quaternary alluvium. Nearly all of the mountain ranges within the DHSP region are fringed by wide aprons of older Pleistocene alluvial fans. A few small areas also contain some earlier Plio-Pleistocene non-marine sediments. Where active drainages have been incised into the Pleistocene deposits, fingers of the more recent alluvium extend upwards toward the mountain ranges. The Pleistocene alluvial deposits are of particular relevance for cultural resources because they have formed relatively stable surfaces, often overlain with desert pavement that has preserved the traces of prehistoric trails as well as other archaeological features. Desert pavement is a surface of angular, interlocking fragments of pebbles, gravel, or boulders in arid areas which forms on level or gently sloping desert flats, fans, or bajadas and lake and river terraces dating to the Pleistocene Epoch. These alluvial terraces also were important sources of fine grained cryptocrystalline tool stone (Laylander and Schaefer 2010).

Geomorphology and Potential for Subsurface Archaeological Resources

Geomorphology is the scientific study of landforms and the processes that shape them. Geomorphologists seek to understand why landscapes look the way they do, to understand landform history and dynamics, and to predict future changes through a combination of field observation, physical experiment, and modeling. Archaeologists use geomorphology to understand how archaeological sites were formed and to predict where sites of various types can be found. Over time, objects, sites and other man-made objects are moved, buried, or exposed by wind, water, plant growth, animal activity, and other natural processes. Geomorphology is a technique that helps archaeologists interpret physical clues in order to understand the specific nature of the changes that have taken place over time. In the case of the current analysis, geomorphology can be used to predict the location of buried sites, to estimate their current condition, and to estimate the relative age of various geological or archaeological features.

No geomorphological investigations were completed by the Applicant for the DHSP vicinity in support of the soils, geology, or cultural resources sections of the DEIS. However, Applied Earthworks combined information collected by the California Division of Mines and Geology (Jen-

nings 1967) and the results of a geoarchaeological field assessment conducted by ECORP for the Desert Sunlight Solar Facility with their own detailed examination of aerial images of the project area and the vicinity. Mapped units are divided between Holocene deposits, which have the potential for containing buried prehistoric deposits, and Pleistocene aged deposits which do not. Two Pleistocene units were identified. These include old alluvial fan deposits (Qfo) and very old alluvial fan deposits (Qfvo). On the surface, these deposits consist of well-developed desert pavement with strong varnish, dating to between 14 and 30 thousand years old. While areas where these geologic units are present would have been attractive as lithic procurement localities for prehistoric peoples, prehistoric archaeological sites created through procurement activities, would be limited to the surface. Aerial imagery indicates that these units are located in a small area along the western boundary of the solar facility area and along Alternative B/C of the gen-tie, accounting for no more than 5 percent of the project area. Five Holocene units were identified: young alluvial stream deposits (Qya), young alluvial sheet wash deposits (Qaly), young alluvial deposits (Qal), young alluvial fan deposits (Qfy), and intermediate alluvial fan deposits (Qfm). These five Holocene deposits are capable of burying prehistoric cultural deposits. However, the higher energy of deposition of Qya deposits may yield a lower degree of site integrity, transporting lighter objects down slope. Using the ECORP model, based on analysis of aerial images and the Jennings geologic map, it can be inferred the approximately 95 percent of the solar facility site has Holocene aged deposits.

Models which predict the sensitivity for buried resources take into account multiple factors. These include the geomorphological factors of energy of deposition and age of deposition, and the cultural factor of suitability or attractiveness. Current surface and environmental conditions and the results of previous survey work indicate that recent (or late) prehistoric exploitation and use of the central and northern portion of the valley was minimal. Site density increases near the upper portions of alluvial fans where raw lithic material may be obtained, or near lake features and associated dune complexes, where lacustrine resources were available during wetter periods. Thus, while geologic conditions in 95 percent of the project area are capable of burying prehistoric sites and preserving them with a high a degree of integrity, the lack of attractiveness to prehistoric peoples for much of the project area suggests a low to moderate sensitivity for buried sites. However, if Holocene subsurface deposits indicate different conditions in the vicinity of the project, such as lacustrine deposits, this conclusion must be reevaluated. No such deposits were observed during subsurface investigations during the geoarchaeological investigations conducted by ECORP in the DSSF project. Therefore, while geologic factors indicated that nearly the entire solar facility site has the potential for buried prehistoric sites, cultural factors lead to the conclusion that there is only a moderate potential for buried resources within the project area as a whole. The east-west generation tie-line segments for Alternatives B, C, and E and south trending segment of Alternative D that ties into the Red Bluff Substation are located in closer proximity to the culturally sensitive portion of the valley, and therefore, are highly sensitive for buried resources, and are the only exception. This possibility of finding buried sites in the Chuckwalla Valley has recently been confirmed at the nearby Genesis Solar Energy Project (GSEP) project where multiple Paleo-Archaic resources have been found above the high lake stand two to three feet below the modern ground surface during construction grading (George Kline BLM, personal communication).

Prehistoric Context

Human populations have occupied the California desert for at least 10,000 years (Moratto 1984). Stratified sites that would aid in providing temporal controls and help establish a cultural chronology are virtually unknown in the study area. The earliest explorations of the Mojave and Colorado Deserts took place in the 1930s and 1940s. During this time a basic cultural-historical outline was established, which has formed the foundation for subsequent efforts. However, these early attempts were based on surface scatters and inference rather than large-scale data recovery projects or regional surveys.

Numerous cultural resource management projects have resulted in dramatic increases in our understanding of the prehistory of the region. Two of the most notable synthetic works include the BLM's large-scale cultural resources inventory of the Central Mojave and Colorado Desert Regions (Gallegos et al. 1980) and Crabtree's (1980) overview. It was not until the late 1990s that any archaeological site was excavated and reported in the literature within 100 kilometers (km) of the DHSP area. Jones and Klar's (2007) recent review of California archaeology builds from where these earlier authors left off, including the results of recent data recovery projects. The following discussion and culture-historical sequence borrows heavily from the Laylander and Schaefer's (2010) recent prehistoric context for the region, except where otherwise referenced.

Cultural Periods and Patterns

Four successive chronological periods, extending back over a period of at least 12,000 years and each with distinctive cultural patterns, provide a framework for understanding the prehistory of the Colorado Desert. In general, the broader periods include (1) the Pleistocene (Malpais and Clovis patterns); (2) the Early Holocene (San Dieguito and Lake Mojave patterns); (3) the Middle Holocene and Early Late Holocene (Pinto, Amargosa, Deadman Lake, and Gypsum patterns); and (4) the Late Prehistoric period (Saratoga Spring, Rose Spring, Yuman, Patayan, Hakataya, and Shoshonean patterns).

Pleistocene Period (Clovis pattern; prior to 10,000 B.C.)

The question of when humans first entered North America remains an important and unresolved issue in human prehistory. The earliest occupation in the wider region that is presently accepted by scientific consensus is represented by the Clovis pattern, dated to ca. 11,500 B.C. Large, foliate projectile points with concave, fluted bases are the hallmark of the Clovis pattern. Reported Clovis sites are fairly numerous in the Mojave Desert, but they are scarce in the Colorado Desert, although occurrences are reported from Pinto Basin, Ocotillo Wells, and the Yuha Desert (Rondeau et al. 2007:64).

Early Holocene period (San Dieguito or Lake Mojave pattern; ca. 10,000-6000 B.C.)

The Early Holocene period is referred to as the San Dieguito pattern in the Colorado Desert and the Lake Mojave pattern in the Mojave Desert. Three phases have been defined for this pattern. Each successive phase is characterized by the addition of new, more sophisticated tool types to the preexisting tool kit. The early Holocene period, as reconstructed from assemblage characteristics and site associations, has been seen as being represented by small, mobile bands exploiting both small and large game and collecting seasonally available wild plants. The

absence or scarcity of milling tools in early Holocene assemblages has been interpreted as reflecting a lack of hard nuts and seeds in the diet. However, manos and portable metates are now increasingly being recognized at coastal sites that have been radiocarbon dated to earlier than 6000 B.C. Arguments have also been advanced for the presence of a well-developed pattern of early Holocene grinding tools, based on finds from the Trans-Pecos area of Texas. Site distributions indicate some of the basic elements of the early Holocene settlement system. The sites may be found on any flat area, but the largest aggregations seem to occur on mesas and terraces overlooking large washes or the margins of lakes. These are areas where a variety of plant and animal resources would have been accessible and where water was available at least seasonally.

Middle Holocene to Early Late Holocene Period (Pinto, Amargosa, Deadman Lake, and Gypsum patterns; ca. 6000 B.C.–A.D. 500)

The long millennia of the middle Holocene period and the early portion of the late Holocene period have often been designated as the Archaic period, characterized by unspecialized hunting-gathering adaptations. Sites dating to this period have been identified more frequently in the Great Basin, Mojave Desert, and Sonoran Desert east of the Colorado River than in the Colorado Desert. It has been suggested that the California deserts were inhospitable during the middle Holocene period due to a hotter-than-present climate, particularly during the so-called Altithermal phase between ca. 5000 and 2000 B.C., and that hunter-gatherers were forced to concentrate around a limited number of favored locations or emigrate to more habitable regions. The later portion of the middle Holocene may have seen the advent of Yuman speakers in the Colorado Desert.

Pinto, Amargosa, Gypsum, and Deadman Lake patterns are among the categories applied to either chronologically successive or regionally specialized variants of middle Holocene and early late Holocene sites. Key elements in distinguishing these patterns have included large, roughly shaped, side- or corner-notched, indented-base ("Pinto") points; large, corner-notched, eared, or split-stem ("Elko") points; and large, contracting-stem ("Gypsum") points. The Pinto pattern was originally recognized in Joshua Tree National Park's Pinto Basin, although the Stahl site in the southwestern Great Basin has often subsequently been used as a type locality for the pattern. The Amargosa pattern, encompassed most of the Colorado Desert and was divided into three phases that also overlapped the early portion of the late prehistoric period (Sutton et al. 2007:236). The Gypsum pattern was linked with the Pinto pattern into an early Pinto-Gypsum pattern, but it was subsequently reassigned to the later portion of the period under discussion, between ca. 2000 B.C. and A.D. 500. The Deadman Lake pattern is a newly proposed entity assigned to the end of the middle Holocene period and identified at Twenty-nine Palms in the southern Mojave Desert (Sutton et al. 2007:239-240).

Some middle Holocene sites have been identified along the boundary between the Colorado Desert and the Peninsular Ranges and at favored habitats at springs and tanks. Additional early sites fairly certainly are still to be discovered, buried under alluvial fans and wash deposits, sand dunes, Lake Cahuilla sediments, or Colorado River valley alluvium.

Late Prehistoric Period (Saratoga Spring, Rose Spring, Yuman, Patayan, Hakataya, and Shoshonean patterns; ca. A.D. 500-1900)

Major innovations during the late Holocene period included the introduction of pottery making by the paddle-and-anvil technique, bow-and-arrow technology, floodplain agriculture, and cremation. The timing of these innovations is still not very precisely known. Agriculture and ceramics were probably introduced either directly from northwestern Mexico or by way of the Hohokam culture on the Gila River. The bow and arrow may have come from the north, where their documented presence (as indicated by small projectile points) is earlier than in the Colorado Desert.

The major late prehistoric patterns are based in part on technological changes and in part on presumed ethnic affiliations. The Saratoga Spring or Rose Spring pattern is defined primarily by the presence of small, expanding-stem ("Rose Spring" and "Eastgate") projectile points, which are interpreted as marking the initial appearance of the bow and arrow. This pattern, generally dated between ca. A.D. 500 and 1200, is well-known in the Mojave Desert, but it has not been clearly reported yet in the Colorado Desert (Sutton et al. 2007).

Yuman, Patayan, and Hakataya are largely synonymous terms for ceramic-bearing sites in southern California after ca. A.D. 500. Although the distribution of these patterns is strongly correlated with the ethnohistoric range of the Yuman linguistic family, it also includes Takic (Uto-Aztecan) areas. The Yuman/Patayan pattern has been further divided into three phases ("Yuman I/II/III" or "Patayan I/II/III") on the basis of proposed changes in pottery traits and types and on proposed correlations with the presence or absence of Lake Cahuilla. The Shoshonean (cf. Northern Uto-Aztecan) pattern is a construct applied to sites postdating ca. A.D. 1200 in the Mojave Desert; these sites, like those of the Yuman/Patayan/Hakataya pattern, are characterized by small, triangular ("Cottonwood") and side-notched ("Desert Side-notched") projectile points. Linguistically, the late prehistoric period likely saw the appearance of Takic-speaking Cahuilla and Serrano in the western Colorado Desert and the southern Mojave Desert; Numic-speaking Chemehuevi in the eastern Mojave Desert and northeastern Colorado Desert; River Yuman-speaking Quechan, Halchidhoma, and Mohave on the lower Colorado River; and Delta-California Yuman-speaking Cocopa and Kumeyaay in the southern Colorado Desert.

Lake Cahuilla in the Salton Basin was a key element in late prehistoric adaptations to the Colorado Desert. The lake arose in several separate episodes during the last 1,000 years and as recently as the seventeenth century A.D., as has been documented by archaeological and geological studies, while more scattered evidence attests to earlier stands. When the lake was present, it offered a range of resources that were not otherwise available in the basin, including freshwater fish, aquatic birds, freshwater mussel, and marsh plants. On the other hand, when the lake was present, the important Obsidian Butte source of obsidian tool stone was inaccessible. A longstanding debate has concerned whether the lake played a central or only a secondary role within Colorado Desert settlement systems and how severely its rises and falls disrupted the lives and lifeways of the region's inhabitants.

Between A.D. 1000 and 1700, desert peoples focused on the lower Colorado River valley appear to have extended their focus beyond the Colorado River floodplain, adopting a more mobile, diversified resource procurement pattern, with increased travel between the river and Lake Cahuilla to the west. Long-range travel to special resource collecting zones and ceremonial locales, trading expeditions, and possibly warfare are reflected by the numerous trail systems

seen throughout the Colorado Desert. Pot drops, trailside shrines, and other evidence of transitory activities are often associated with these trails. The Chuckwalla Valley encompasses an important travel route between the Colorado River and the Coachella Valley.

Several local varieties of pottery appeared during the late prehistoric period. Many of the pictographs, petroglyphs, and bedrock grinding features in the Colorado Desert were probably also produced during the late prehistoric period, although it is difficult to date such features directly or to determine their cultural affiliations. During this period, and possibly also in the preceding middle Holocene period, specific volcanic and sandstone rock outcrops along the Colorado and Gila rivers were exploited for the manufacture of stone pestles and portable milling slabs.

Regional Prehistory

Over 200 prehistoric sites have been recorded in the Chuckwalla Valley. Past peoples inhabiting the area appear to have been very mobile, especially during late prehistoric and early historic times. During early historic times, native peoples inhabited towns/hamlets located along the Colorado River, within the Coachella Valley, and at major desert springs/oases.

The Chuckwalla Valley was a relatively closed resource exploitation zone. It served as an east-west oriented trade route/corridor between the Pacific Ocean and the Colorado River/greater Southwest. An extensive network of trails is present within the Chuckwalla Valley. Given its orientation and location, the valley may have been neutral territory (i.e., a buffer zone), unclaimed by neighboring native peoples. Quarry sites probably were "owned" by tribal groups. The distribution of particular types of toolstones may have corresponded to a group's territorial boundaries, and a toolstone type may not have occurred beyond the limits of a group's specific territory.

Within the Chuckwalla Valley, prehistoric sites are clustered around springs, wells, and other obvious important features/resources. Sites include villages with cemeteries, occupation sites with and without pottery, large and small concentrations of ceramic sherds and flaked stone tools, rock art sites, rock shelters with perishable items, rock rings/stone circles, geoglyphs, and cleared areas, a vast network of trails, markers and shrines, and quarry sites. Possible village locations are present at Palen Lake, Granite Well, and Hayfield Canyon.

A cluster of temporary habitation and special activity (task) sites occurs around a quarry workshop in the Chuckwalla Valley. The Chuckwalla Valley aplite quarry workshop complex probably was used throughout the Holocene. During this period, Chuckwalla Valley most likely was occupied, abandoned, and reoccupied by a succession of ethnic groups. In the Early Holocene (i.e., Lake Mohave complex times), the area may have been relatively densely inhabited. During the Middle Holocene (i.e., Pinto and Gypsum complexes period) it may only have been sporadically visited. The subsequent Late Holocene Rose Spring and Late Prehistoric periods probably witnessed reoccupation of the valley by Yuman and Numic-speaking peoples.

Ethnohistoric Context

The following discussion is based primarily on Bean (1978), Bean and Toenjes (2010), Bee (1983), Harwell and Kelly (1983), Kroeber (1925) and Stewart (1983a, b). The information gathered in the separate literature review compiled by Earle and Associates entitled "Ethnographic and Ethnohistoric Information on Chuckwalla Valley and Vicinity" is not included here.

A number of ethnographically documented culture groups are associated with the Chuckwalla Valley through historical use and oral history. These include the Cahuilla, Serrano, Chemehuevi, Mohave, Quechan (Yuma), Maricopa, and Halchidoma. All of these groups were at home in the deserts, but lived primarily near reliable water sources including the Colorado River, inland lakes, and numerous seeps and springs.

Research covering the ethnographic period for this region suggests a relative fluidity in territorial boundaries over time. This fluidity, in general, is represented in the use, abandonment, intrusion, and displacement of the people along the Colorado River, in particular. Further, much of this shifting in territories and boundaries during the ethnographic period can be assigned to intertribal warfare. Such activities may have fluctuated between territorial controls of the local resources to a joint-use model where multiple groups may have had varying levels of access to those resources.

Those who lived along the Colorado were linked in a well-established system of alliances and antagonistic relationships that stretched from the Pacific to the inland horticultural societies as far east as Hopi. This system also ordered a system of trade and reciprocal exchange. Ethnic boundaries at the tribal rather than band level and tribal ownership of land were also tailored to the environmental situation.

In the northern Sonoran Desert during the Protohistoric and Historical periods, traditional allies and trading partners formed two antagonistic groups. The culture groups along the Colorado River to the east of the DHSP were part of this "international" network.

In one group, the Halchidhoma and Maricopa were allied with the Pima, Papago, and Cocopa among others to the east, and the Cahuilla, Diegueño, and Serrano to the west. The Gabrielino were trading partners. In the opposing group, the Mohave and Quechan were allied with the Chemehuevi (Southern Paiute) and Yavapai to the north and east, and the Kamia to the west. They were trading partners with the Northern Serrano, Chumash, Yokuts, and Tubatulabal to the west. Southwestern Pueblo peoples, such as the Hopi, were interested trading partners in this system, but they were largely neutral. The Kohuana and Halyikwamai along the lower Colorado River, though notably of an affinity with the Maricopa and Halchidhoma, at times cooperated with the Mohave and Quechan.

The Cahuilla

A wealth of information exists regarding traditional and historic Cahuilla society and culture (Bean and Toenjes 2010). The Cahuilla language, divided into Desert, Pass, and Mountain dialects, has been assigned to the Cupan subfamily of the Takic branch of the Uto-Aztecan linguistic family. Territory traditionally claimed by the Cahuilla was topographically complex, including mountain ranges, passes, canyons, valleys, and desert. Bean (1978:375) described it as, "…from the summit of the San Bernardino Mountains in the north to Borrego Springs and the Chocolate Mountains in the south, a portion of the Colorado Desert west of Orocopia Mountain to the east, and the San Jacinto Plain near Riverside and the eastern slopes of Palomar Mountain to the west." The natural boundaries of the desert, mountains, hills, and plains separated the Cahuilla from surrounding Native American groups. The Cahuilla interacted with surrounding peoples via intermarriage, ritual, trade, and war. The Cahuilla, Gabrielino, Serrano, and Luiseño shared common cultural traditions, with the Cahuilla having especially close ties to the two former groups.

Cahuilla villages usually were located in canyons or on alluvial fans near water and food patches. The area immediately around a village was owned in common by a lineage. Other lands were divided into tracts owned by clans, families, and individuals. Numerous sacred sites with rock art were associated with each village. Villages were connected by trail networks used for hunting, trading, and social visiting. Trading was a prevalent economic activity. Some Cahuilla were trading specialists. The Cahuilla went as far west as the Channel Islands and east to the Gila River to trade.

Hunting and meat processing were done by men. Game included deer, mountain sheep, pronghorn, rabbits, rodents, and birds. These were pursued by individuals and communal hunting groups. Blinds, pits, bows and arrows, throwing sticks, nets, snares, and traps were used to procure game. Communal hunts with fire drives sometimes occurred.

The Cahuilla had access to an immense variety of plant resources present within a diverse suite of habitats. Several hundred plant species were used for food, manufacture, and medicine. Acorns, mesquite and screw beans, pinyon nuts, and cactus fruits were the most important plant foods. They were supplemented by a host of seeds, tubers, roots, bulbs, fruits and berries, and greens. Corn, beans, squash, and melons were cultivated. Over 200 species of plants were used as medicines.

Structures varied in size from brush structures to dome-shaped or rectangular houses, 15–20 feet long, and ceremonial houses. The chief's house usually was the largest. Used for many social, ceremonial, and religious functions, it was located near a good water source. It generally was next to the ceremonial house, which was used for rituals, curing, and recreational activities. Other structures included a communal men's sweathouse and granaries.

Mortars and pestles, manos and metates, pottery, and baskets were used to process and prepare plant and animal foods. Cahuilla material culture included a variety of decorated and plain baskets; painted/incised pottery; bows, arrows, and other hunting-related equipment; clothing, sandals, and blankets; ceremonial and ritual costumes and regalia; and cordage, rope, and mats. Games and music were important social and ritual activities for the Cahuilla.

The Cahuilla had named clans, composed of between 3 and 10 lineages, with distinct dialects, common genitors, and a founding lineage. Each lineage owned particular lands, stories, songs, and anecdotes. Each lineage occupied a village and controlled specific resource areas. Clan territory was jointly owned by all clan members. Territory ownership was established by marked boundaries (rock art, geographic features), and oral tradition. Most of a clan's territory was open to all Cahuilla. Kinship rules determined rights to assets and responsibilities within a lineage. Each lineage cooperated in defense, large-scale subsistence activities, and ritual performance. The founding lineage within a clan often owned the office of ceremonial leader, the ceremonial house, and sacred bundle. Artifacts and equipment used in rituals and subsistence was owned by individuals and could be sold or loaned.

The office of lineage leader usually passed from father to eldest son. He was responsible for correct performance of rituals, care of the sacred bundle, and maintenance of the ceremonial house. The lineage leader also determined when and where people could gather and hunt, administered first-fruits rites, and stored food and goods. He knew boundaries and ownership rights, resolving conflict with binding decisions. The lineage leader met with other lineage leaders concerning various issues. He was assisted in his duties by a hereditary official respon-

sible for arranging details for performance of rituals. Other functionaries included song leaders/ceremonialists, assisted by singers and dancers.

Laws were enforced by ritual, stories, anecdotes, and direct action. Supernatural and direct sanctions were used. Tradition provided authority. The past was the referent for the present and future. Old age provided access to privilege, power, and honor. Reciprocity was a significant expectation. Doing things slowly, deliberatively, and thoughtfully was stressed. Integrity and dependability in personal relations were valued. Secrecy and caution were exercised in dealing with knowledge.

Disputes between Cahuilla villages usually arose over access to resources. Other causes included sorcery, personal insults, kidnapping of women, nonpayment of bride price, and theft. Armed conflict occurred after all other efforts to resolve things had failed. A lineage leader and/or skillful warrior lead a temporary war party. Community rituals were held before and after a fight, which usually involved ambush.

Ritual and ceremony were a constant factor in Cahuilla society. Some ceremonies were scheduled and routine, while others were sporadic and situational. The most important ceremonies were the annual mourning ceremony, the eagle ceremony, rites of passage (especially those associated with birth, naming, puberty, and marriage), status changes of adults, and rituals directed towards subsistence resources. The main focus was upon performance of cosmologically oriented song cycles, which placed the Cahuilla universe in perspective, reaffirming the relationship(s) of the Cahuilla to the sacred past, present, to one another, and to all things.

The Serrano

The Serrano Cahuilla shared many traits and artifacts with the Cahuilla, discussed above (Bean and Toenjes 2010). The Serrano spoke a language belonging to the Serran Group of the Takic subfamily of the Uto-Aztecan family. It is nearly impossible to assign definite boundaries to Serrano territory. Territory traditionally claimed by the Serrano included the San Bernardino Mountains east of Cajon Pass, lands in the desert near Victorville, and territory extending east in the desert to Twenty-nine Palms and south to, and including, the Yucaipa Valley.

The Serrano occupied small village-hamlets located mainly in the foothills near water sources. Others were at higher elevations in coniferous forest, or in the desert. The availability of water was a critical determinant of the nature, duration, and distribution of Serrano settlements.

Women gathered, and men hunted and occasionally fished. Topography, elevations, and biota present within the Serrano territory varied greatly. Primary plant foods varied with locality. In the foothills, they included acorns and pinyon nuts. In the desert, honey mesquite, pinyon, yucca roots, and cactus fruits were staples. In both areas they were supplemented by a variety of roots, bulbs, shoots, and seeds, especially chia. Among primary game animals were deer, mountain sheep, pronghorn, rabbits, rodents, and quail. Large game was hunted with bows and arrows. Small game was taken with throwing sticks, traps, snares, and deadfalls. Meat was cooked in earth ovens. Meat and plant foods were parched or boiled in baskets. Plant foods were ground, pounded, or pulverized in mortars and pestles or with manos and metates. Processed meat and plant foods were dried and stored. Occasional communal deer and rabbit hunts were held. Communal acorn, pine nut, and mesquite gathering expeditions took place. These communal activities involved several lineages under a lineage leader's authority.

Serrano houses were circular, domed, individual family dwellings, with willow frames and tule thatching. They were occupied by a husband and wife along with their children, and often other kin. Houses were mainly used for sleeping and storage. Most daily activities occurred outside, often in the shade of a ramada (a flat-roofed, open-sided shade structure) or other sun cover.

Settlements usually had a large ceremonial house where the lineage leader and his family lived. It was the social and religious center for each lineage/lineage set. The latter was two or more lineages linked by marriage, economic reciprocity, and ritual participation. Other structures included semi-subterranean, earth-covered sweathouses located near water, and granaries.

Serrano material culture was very similar to that of the Cahuilla. Stone, wood, bone, plant fibers, and shell were used to make a variety of artifacts. These included highly decorated baskets, pottery, rabbit skin blankets, bone awls, bows and arrows, arrowshaft straighteners, fire drills, stone pipes, musical instruments, feathered costumes, mats, bags, storage pouches, cordage, and nets.

The clan was the largest autonomous landholding and political unit. No pan-tribal union between clans existed. Clans were aligned through economic, marital, and ceremonial reciprocity. Serrano clans often were allied with Cahuilla clans and Chemehuevi groups. The core of a clan was the linage. A lineage included all men recognizing descent from a common ancestor, their wives, and their descendants. Serrano lineages were autonomous and localized, each occupying and using defined, favored territories. A lineage rarely claimed territory at a distance from its home base.

The head of a clan was a ceremonial and religious leader. He also determined where and when people could hunt and gather. Clan leadership was passed down from father to son. The clan leader was assisted by a hereditary ceremonial official, from a different clan. This official held ceremonial paraphernalia (the sacred bundle), notified people about ceremonies, and handled ceremonial logistics.

Serrano shamans were primarily healers who acquired their powers through dreaming. A shaman cured illness by sucking it out of the sick person and by the administration of herbal medicines. Various phases of an individual's' life cycle were occasions for ceremonies. After a woman gave birth, the mother and baby were "roasted," and a feast held. Differing puberty ceremonies were held for boys (datura ingestion used in a structured ceremonial vision quest) and girls ("pit roasting," ingestion of bitter herbs, dietary restrictions, instruction on how to be good wives). The dead were cremated, and a memorial service was held. During the annual seven-day mourning ceremony, the sacred bundle was displayed, the eagle-killing ceremony took place, a naming ceremony for all those born during the preceding year was held, images were made and burned of those who had died in the previous year, and the eagle dance was performed.

The Chemehuevi

The Chemehuevi spoke a language belonging to the Southern Group of the Numic subfamily of the Uto-Aztecan family (Bean and Toenjes 2010). Many traits characterizing Chemehuevi culture are very similar or identical to those of the Mohave, discussed below. Several probable Quechan traits also were noted for the Chemehuevi. For the territory traditionally claimed by the Chemehuevi, the Colorado River formed the eastern boundary south to the Palo Verde Mountains. The boundary then ran northwest, passing east of the Ironwood Mountains, crossing the

Maria Mountains, paralleling the Iron Mountains, and then running between Old Woman Mountain and Cadiz Dry Lake. Mohave territory lay to the northeast, and that of the Las Vegas group of Southern Paiute to the north-northwest.

The Chemehuevi lacked any form of overall "tribal" organization. Anthropologists refer to territorial subdivisions among the Chemehuevi as "bands." Each band was composed of a small number of camps/communities/villages. Bands most likely correspond to economic clusters. Each group was a geographic unit, associated with a definite territory. In general, each band was economically self-sufficient.

In general, Chemehuevi settlement was mobile and scattered, with residence recurring within a fixed area. Houses were closely grouped. Their occupants usually were related by blood or marriage. Settlement size ranged from 1 to 2 households to 10 to 20. Springs often were inherited private property. Married siblings often camped at the same spring.

The Chemehuevi traveled widely. They had amicable contact with the Serrano, Cahuilla, Quechan/Yumans, and other Native American groups. The Chemehuevi sometimes joined with the Mohave/Quechan to fight the Cocopa/Halchidhoma. The Chemehuevi often crossed the Colorado River and hunted deer in Quechan, Yavapai, and Western Walapai territory. They also traded, intermarried, and competed in games with the Yavapai. To the west, the Chemehuevi hunted in the Tehachapi area and went to the Pacific Coast along the Santa Barbara Channel to get abalone shell. Sometimes, a party of 8 to 10 Chemehuevi men joined men from neighboring groups to make a two-month journey to the Hopi villages (in what is now New Mexico) to trade.

The Chemehuevi apparently did not eat fish, but bighorn sheep, deer, pronghorn antelope, and desert tortoise were among the animal food resources they used. Plant foods in this region included pinyon nuts and mescal. Men inherited rights to hunt large game within certain tracts, defined in songs using geographic references. Women gathered a great variety of plant foods, which were more important in the Chemehuevi diet than game. In addition to pinyon nuts and mescal, agave and seeds were staples. Along the Colorado River, the Chemehuevi practiced floodplain agriculture. They grew corn, squash, gourds, beans, sunflowers, amaranth, winter wheat, grasses, and devil's claw using techniques similar to Mohave agricultural practices (see below).

Chemehuevi winter houses were conical/subconical structures. They also built earth-covered houses without a front wall, similar to those constructed by the Mohave. During the summer, many Chemehuevi lived outside, often building and occupying ramadas and windbreaks.

With respect to material culture, Chemehuevi baskets and cradles were made from plant fibers. Plant fibers also provided materials for rope, string, and cordage nets. Pottery, which followed Mohave patterns and styles, included cooking pots, water jars, seed germination and storage pots, spoons/scoops, and large pots for ferrying children across the Colorado River. Watercraft included log rafts and reed balsas. Clothing consisted of double skin or fiber aprons and sandals for men and women. The Chemehuevi commonly had pierced ears and wore body paint.

Monogamy was the commonest form of marriage among the Chemehuevi, but some men had more than one wife. Women gave birth in a special enclosure, followed by a 30-day period of seclusion for mother, father, and child. Puberty rites for boys and girls were held, with the former

focused on acquisition of hunting skills. Cremation of the dead was traditional, replaced by in-ground burial in the historic period.

In general, no central political control existed. Territorial boundaries were not rigid, and some bands were named, while others were not. The basic social and economic unit was the nuclear family and could include other close kin. Groups of individual households moved together on hunting and gathering trips, returning to the same spring or agricultural site. Most large bands had a headman whose leadership was more advisory than authoritative. He was usually succeeded by his eldest son.

The principal role of Chemehuevi shamans was curing illness. They acquired their healing powers through dreams rather than through the use of datura or a trance. Chemehuevi families held a mourning ceremony ("cry"), with which several speeches and songs were associated, within the year after the death of a relative. The "cry" was sponsored by the family and included the ceremonial burning of material goods.

The Chemehuevi had deer and mountain sheep song-dances, held for entertainment and hunting success. The Chemehuevi had other songs, as well: bird, salt, quail, and funeral songs. During winter evenings, men narrated a rich body of traditional stories and myths. These performances often included mimicry, song, and audience participation. Oral tradition related people to social norms, their territories, and to the subsistence resources present within them.

The Mohave

Information regarding the traditional lifeways of the Mohave has mainly been drawn from the accounts of early explorers and/or fur trappers who were among the first to encounter native groups, as well as from the later ethnographic accounts of anthropologists, usually well after the influences of Euro-American contact had begun to alter traditional ways of life. The following summary derives mainly from Kroeber (1925).

The name Mohave is a variation on the name Hamakhava, which is what the tribal people called themselves. The Mohave language is classified into the Yuman subfamily of the Hokan language family. The Mohave were the northernmost and largest tribe of the River and Delta Yumans, who comprised a series of agricultural tribes that occupied the lower Colorado and Gila Rivers. The traditional ethnographic territory attributed to the Mohave includes the Mojave, Chemehuevi, and Colorado River Valleys along the lower Colorado River at the intersection of the borders of Arizona, Nevada, and California. In pre-contact times, Mohave tribal settlement is reported to have centered in the Mohave Valley where their population densities were observed to be the greatest.

The Colorado River served as something of an oasis in the otherwise harsh, dry environment that surrounded the river valleys. The spring overflow of the river, which spread gently over the bottomlands, left behind a rich silt deposit in its recession. It is within these bottomlands that the Mohave cultivated crops, which served as the foundation of their subsistence economy. Their agricultural methods were relatively simple, consisting of planting seeds on the richly silted floodplains and allowing their crops to mature with a minimum of maintenance or effort. Corn was the primary crop, but several varieties of tepary beans, pumpkins, melons, and other plants were also grown. Once harvested, the portions of the harvest that were not immediately consumed were dried in the sun and stored in large basketry granaries. The Mohave supplemented their

diet mainly by gathering wild plants and by fishing, which served as their principal source of flesh non-plant food. Hunting played a minor role in the Mohave subsistence economy.

Technology of the Mohave was relatively simple, and tools were reported to have been crafted to meet only the minimum requirements of utility. According to Kroeber (1925, p. 736), the farming implements consisted of only two items: a heavy wooden staff or digging stick for planting and a spatulate wooden hoe-like implement, whose square edge was pushed flat over the ground to control weeds. Metates, consisting of a rectangular block of stone, were used for grinding corn, wheat, and beans, and both stone and wooden pestles, as well as stone mortars, were also used for food processing (Kroeber 1925, pp. 736–737). Fish were commonly taken with seines, large basketry scoops, sieves, dip nets, and weirs. The bow and arrow and cactus-spine fish hooks were also used for fishing. Mojave basketry was crudely woven, and their pottery was basic and utilitarian. Since hunting was of relatively little significance to the Mohave, hunting devices and techniques were not well developed, consisting mainly of snares, nets, bow and arrow, or curved throwing sticks.

Mohave political and social organization was very informal, and no one individual or group had significant authority over another. Despite the Mohave's loose division into bands or local groups that were spread out over great distances, their cohesion as a tribe was very strong, and they considered themselves as one people occupying a nation with a well-defined territory.

The nuclear family was the basic unit of economic and social cooperation, although the extended family constituted the core of a settlement. Rather than large centralized villages, Mohave settlements were widely distributed along the riverbanks in close proximity to arable lands. Houses were situated on low rises above the floodplain and often separated by as much as a mile or two. During most of the year, the Mohave slept under ramadas; however, during the colder season, they occupied more substantial, semi-subterranean, rectangular earth-covered houses.

Warfare was a dominant strain in River Yuman culture, and the Mohave's strong tribal unity served them well in times of warfare. They apparently traveled great distances to do battle, and their principal weapons were bows and arrows and hard wood clubs. According to Kroeber (1925, p. 727), their main motivation was sheer curiosity, as they liked to see other lands and were eager to know the manners of other peoples, but were not heavily interested in trade.

The Mohave were culturally similar to the other River and Delta Yumans: the Quechan, Halichidhoma, Maricopa, and Cocopa. During ethnographic times, the Quechan were considered friends and allies of the Mohave, while the Halchidhoma, Maricopa, and Cocopa were considered to be enemies with whom the Mohave engaged in warfare. The Mohave were also friendly with the Upland Yuman tribes of the Yavapai and Walapai of western Arizona, although relations with the Walapai were somewhat mixed. One of the most important rituals observed by the Mohave centered on death, namely the funeral and subsequent commemorative mourning ceremony. As soon as possible after death, the deceased was cremated upon a funeral pyre along with all of his or her possessions. The house and granary of the deceased were also burned. It was believed that by burning, these things would be transmitted to the land of the dead along with the soul of the deceased.

Due to their relatively remote location inland, the Mohave maintained their independence throughout the Spanish period of the sixteenth and seventeenth centuries and were only rarely visited by explorers during that time. The few Spanish accounts of encounters with the Mohave

provided similar descriptions of Mohave lifeways as those reported later by ethnographers. It is believed that the ancestors of the Mojave resided in the area for at least 1,000 years and the mode of life in prehistoric times is thought to be similar to that observed historically.

The Quechan/Yuma

The following summary of the Quechan or Yuma is derived mainly from Bee (1983) and Kroeber (1925).

Quechan is a variation on the names Kwichyan or Kuchiana, which are the names the tribe called themselves, but this group is also commonly known as the Yuma. The Quechan are among the Yuman-speaking tribes who occupied the lower Colorado River where it forms the boundary between California and Arizona. According to Kroeber (1925, p. 782), the Quechan and their neighbors to the north, the Mohave, appear to be virtually identical in terms of their agriculture, manufactures, clothing, hair styles, houses, warfare, and sense of tribal unity.

The ethnographic territory traditionally associated with the Quechan, now divided between the states of California and Arizona, is centered around the confluence of the Colorado and the Gila Rivers, extending several miles north and south along the Colorado and east along the Gila. Quechan legend tells of a southward migration of their ancestors from a sacred mountain; however, it is not known when the ancestors of the Quechan first settled near the confluence (Bee 1983, p. 86). No group of this name was mentioned in the account of Hernando de Alarcón when he passed through the area during an expedition in 1540, and the first reference to this group did not appear in Spanish documents until the late seventeenth century, at which time they were settled around the river confluence area (Bee 1983, p. 86).

In an environment otherwise surrounded by dry desert terrain, the subsistence economy of the Quechan focused on riverine agriculture, which was one of the main sources of food for the tribe. Crops were cultivated in the richly silted river bottomlands following the recession of the spring floods and provided a relatively high yield in exchange for relatively low labor output (Bee 1983, pp. 86–87). The main cultivated crops included corn, tepary beans, pumpkins, and gourds. In post-contact times, watermelons, black-eyed peas, muskmelons, and wheat were introduced by Europeans and brought into cultivation by the Quechan, as well. The Quechan also relied on the gathering of wild foods, the most important of which were mesquite and screw-bean pods, although a variety of other wild plants were also collected (Bee 1983, p. 87). Fishing was of minor importance, as there were few species in the lower Colorado River suitable for eating. Among the fish sought were the humpback, white salmon, and boneytail, which were sometimes caught with unfeathered arrows or cactus-spine hooks, but more often taken with traps and nets during floods. Given the low incidence of game available in the area, hunting played a minor role in the overall subsistence economy (Bee 1983, p. 86).

Like the Mohave, Quechan tribal settlements, or rancherias, consisted of extended family groups that were widely dispersed along the riverbanks. Settlements shifted throughout the year, dispersing into smaller groups along the bottomlands during the spring and summer farming seasons and reconvening into larger groups on higher ground, away from the river, during the winter and spring flood periods (Bee 1983, pp. 87–88). The geographic dispersion of the households within the rancheria groups was closely correlated with the condition of the rivers and the technology of riverine agriculture (Bee 1983, p. 89). The warm climate and scant precipitation made substantial housing unnecessary for most of the year, so most people made use of

ramadas or dome-shaped arrowweed shelters. Each rancheria typically had one or two large, earth-covered shelters for the rancheria leaders' families, but these shelters also accommodated small crowds during colder weather.

Much like the Mohave, Quechan technology lacked technical or decorative elaboration beyond the demands of minimal utility (Bee 1983, p. 89). Quechan bows did not feature "backed" construction and so lacked power, and their arrows were frequently untipped, so the bow and arrow's range was short and the penetrating power weak. Sharpened staffs served as digging sticks or, when cut in longer lengths, as weapons (Bee 1983, p. 89).

In terms of property, there were no marked gradations in wealth, and social pressure favored the sharing of one's abundance with others who were less fortunate. Land ownership was informal, and people did not show much interest in the accumulation of material goods beyond the immediate needs of the family group or the surplus maintained by local leaders for redistribution to needy families within their rancheria (Bee 1983, p. 89). Lands were not inherited by family members upon the death of an individual; rather, the lands of the deceased were abandoned, and replacement plots were sought by the family members.

Despite the wide distribution of settlements, the Quechan had a strong sense of tribal unity. As with their neighbors and allies, the Mohave, warfare played a major role in Quechan culture, and it was during times of warfare that tribal unity was most prevalent among the individual settlements (Bee 1983, p. 92). Their major enemies were the Cocopa and the Maricopa, and they often allied themselves with the Mohave in strikes against common enemies (Bee 1983, p. 93). Bee (1983, p. 93) suggests that warfare among the riverine peoples may have increased in scale and intensity during the eighteenth and early nineteenth centuries due to new economic incentives, such as the opportunity to trade captives to the Spaniards or to other tribes for horses or goods.

Quechan social and political organization, like that of the Mohave, appears to have been very informal, with no one individual or group having significant authority over others. Two types of tribal leadership have been reported for the Quechan, one for civil affairs and the other for war, but it is questionable how influential these leadership roles may have been. Each rancheria had one or more headmen, but their authority was contingent upon public support and continued demonstration of competence. According to Bee (1983, p. 92), important matters at either the tribal or the rancheria level were always decided by consensus, sometimes after long debates dominated by the better and more forceful speaker.

Another important aspect of Quechan society that was shared with the Mohave concerns the commemoration of the dead, which was an elaborate ceremony involving wailing and the destruction of property and ritual paraphernalia. All possessions of the deceased, including the family home, were destroyed or given away (Bee 1983, pp. 89, 93–94).

The Maricopa and the Halchidhoma

Ethnographic information for the Maricopa and Halchidhoma is meager in comparison to the Mohave and the Quechan. The following brief summary is derived from Harwell and Kelly (1983).

The Halchidhoma first entered written history in the early seventeenth century with the account of Juan de Oñate, who encountered the "Alebdoma" or "Halchedoma" during a Spanish expedition on the lower Colorado River, below its junction with the Gila River. When later encoun-

tered by missionary-explorer Eusebio Francisco Kino in the early eighteenth century, the Halchidhoma (or "Alchedoma," as they were referred to by Kino) had moved farther north up the Colorado beyond the Gila. The traditional territory attributed to the Halchidhoma lay along the lower Colorado between the Mohave and the Quechan territories. They were later driven from that area under pressure from their hostile Mohave and Quechan neighbors and moved to the middle Gila River area, where some merged with the Maricopa.

The term Maricopa refers to the Yuman-speaking groups who in the early nineteenth century occupied the area along or near the Gila River and its tributaries (in what is now southern Arizona), but who earlier had occupied the lower Colorado River area. The Maricopa language is closely related to Quechan and Mohave, all three of which are classified as members of the River branch of the Yuman language family (Harwell and Kelly 1983, p. 71). The Maricopa call themselves pi•pa•s, "the people." The name Maricopa is an English abbreviation of the name Cocomaricopa, first used by Eusebio Kino in the late seventeenth century (Harwell and Kelly 1983, p. 83).

The Maricopa, who by the early nineteenth century included remnant tribes of the Halyikwamai, Kahwan, Halchidhoma, and Kavelchadom, share common origins and are culturally similar to both the Quechan and the Mohave, the most prominent traits of which included floodwater agriculture and cremation of the dead. Their material culture was also essentially the same (Harwell and Kelly 1983, p. 71). The Colorado River Maricopa lived in low, rectangular, earth-covered houses, but the Maricopa of the Gila River had adopted the round houses of their Piman neighbors. Technology was of little interest to the River Yumans and remained at a low level of development.

Recent Ethnography

The most recent ethnographic research in the DHSP vicinity is currently being conducted by Lowell Bean, Jim Toenjes and Ginger Ridgeway as part of cumulative impact mitigation efforts associated with the Blythe Solar Power Project, Genesis Solar Energy Project, and Palen Solar Power Project (Bean and Toenjes 2010). Their research explores the connection between physical trails located in project vicinity, place names recorded in traditional Chemehuevi and Mohave songs, current use of the project area, and recommendations for mitigation of impacts to resources in the area. Historically, ownership of territory was established and recorded in songs that belonged to specific individuals; song named the places the singers owned. Dr. Bean and his associates have been collecting data and geographic information from Chemehuevi song trails, Mohave dream trails and other place names from published sources, unpublished manuscripts, archival data, and field notes. The places are being identified with digital mapping software and entered into an Access database sortable by place name, tribe, and traveled route. They have also been conducting interviews of native peoples to traditional sites, current uses of the desert area, hunting, plant gathering, mining, and trail running.

The preliminary results of these interviews and research suggest that traditional religious practice among the peoples whose ancestors occupied and used the project vicinity survives principally in mortuary rites. At such rites, traditional songs that describe journeys and treks that took place in "creation time" are sung. These journeys and treks involve places in the project vicinity for both the Chemehuevi/Paiute and Mohave. When the songs are sung, participants in the rites revisualize the places that are mentioned, and this recreation of the sacred past, respondents explained, involves a memory of what they have actually seen when they have traveled through the desert.

Some of the sacred places are mountains; some are stands of plants like pinyons that they, like people in the sacred past, harvest with due ritual; some are the habitats of animals like mountain sheep that have religious significance for Native Americans; and some are places that may be marked by petroglyphs or rock features. Some respondents purposely make trips into the project vicinity to seek religious power. Whether they do so or not, they indicate that the destruction to the landscape, both physical and visual, by the planned construction projects, is an unmitigable offense to the sacredness and spirituality of the landscape. For many, it presents a denial of the opportunity to engage in traditional religious activities. Many Native Americans interviewed felt that the only appropriate mitigation would be to not proceed with the projects.

In the event that this is not feasible, the following recommendations are made:

1. Native Americans from groups most concerned should be present during construction to advise with respect to mitigation of impacts on surface and subsurface cultural resources.

2. Whenever possible, Native Americans should be employed on the project, not only during the construction phase, but also for ongoing operational tasks, particularly monitoring of archaeological fieldwork and construction.

3. When impact to plant or animal communities of concern to Native Americans cannot be avoided by moving the lines, consideration should be given to transplantation, especially if the species are endangered or rare.

4. Places that are eligible for the National Register on the basis of ethnographic and/or historic sensitivity should be avoided or protected. If avoidance is impossible, a plan for the protection of the resource should be developed with Native American participation.

5. Sites that have a high sensitivity rating because they have religious or spiritual value to Native Americans should be avoided or protected to the extent that a site with religious or spiritual value to any other group would be avoided or protected. The Native American Religious Freedom Act of 1978, P.L. 95-341 (Federal Agencies' Task Force 1979) reaffirms that Native Americans have the same rights to religious freedom as other Americans.

6. If Native American burial or cremation sites cannot be avoided and are in danger of negative impact, Native Americans should be consulted about appropriate action, including recovery and disposition of remains.

7. An effort should be made to curate artifacts collected from the Study Area in a facility approved by Native Americans or returned to a location at or near "where they [recovered materials] live," meaning where they were originally collected.

Historic Context

The DHSP is located in an area that has historically been and remains remote from centers of development and settlement. The primary themes in this discussion focus on Spanish and Mexican routes through the desert, and early American traffic, mining, transportation, military training, power transmission, and agriculture/ranching. The following discussion is based primarily on Bischoff (2000), Bischoff et al. (2010), and Von Till Warren (1981).

Spanish and Mexican Routes through the Desert

Sixteenth-century maritime Spanish explorer, Hernando de Alarcon, made the first in-roads into the region in 1540, ascending 85 miles up the Colorado River to the head of navigation near present-day Yuma. Alarcon was sent to supply Coronado's land expedition that had set out on foot from Compostela, Mexico, in search of the fabled seven cities of gold. He eventually cached the supplies and departed after waiting many days. Melchior Diaz, leading a small contingent of Coronado's land unit, later arrived and recovered the supplies. Both Alarcon and Diaz reported the bleak nature of the country. The interior of the Colorado Desert was not explored further until 1702 when Father Eusebio Francisco Kino, a Jesuit missionary, situated in Sonora, began seeking an overland route to coastal California (Von Till Warren 1980, pp. 83–88).

Nearly seventy years later, Francisco Garcés (a Franciscan Padre) also seeking a route to the coast, forded the Colorado River at the mouth of the Gila River, traveling west through the desert before despairing and turning back. His efforts were eventually rewarded in March of 1774, arriving at Mission San Gabriel, accompanying the expedition of Captain Juan Bautista de Anza. Two mission outposts were subsequently established near present-day Yuma in 1779 to minister to the native Quechan and strengthen Spain's hold on this strategic point of entry into California. All passage along this route, later known as the Anza or Yuma Trail, was discontinued in 1781 when the Quechan revolted, killing over thirty missionaries, settlers, and soldiers, including Garcés.

Jose Maria Romero, a Mexican Army captain, explored a second route between 1823 and 1826, along the indigenous Halchidhoma Trail. He had learned of this route a couple of years earlier when a group of Cocomaricopa Indians from Arizona arrived at Mission San Gabriel, having reportedly crossed the Colorado River near present-day Blythe, journeying westward through the Chuckwalla Valley and over the San Gorgonio Pass. On January 6, 1824, Romero was likely in the vicinity of Palen Lake, having made his way up the Salton Wash, between the Orocopias and Chuckwallas. Estudillo, one of the members of the expedition, noted horse paths and footpaths of the Indians, and bones along the trail.

Early American Trans-Desert Crossings

In 1846, during the opening stages of the Mexican-American war, General Stephen Watts Kearny led an advance column of the United States Army into the region. From Santa Fe, Kearny's troops entered California by way of Yuma, reaching San Diego in December, having abandoned their wagons shortly after crossing the Rio Grande. The war ended in 1848 with the signing of the Treaty of Guadalupe Hidalgo (Lamb n.d.).

Only days after the Mexican-American War ended, gold was discovered, kicking off the California Rush of 1849. It is estimated that more than 100,000 travelers passed by way of the Yuma Crossing. The presence of so many travelers along the route had a definite impact on the desert. Whereas previous expeditions made the journey in isolation, during the Gold Rush, trails became relative highways. Companies of miners frequently encountered one another or ran across the remains of recently vacated campsites. The desert floor also became littered with articles abandoned when they either fell apart or proved too heavy or cumbersome for their weary owners. Broken wagons, furniture, articles of clothing, tools and even weapons left by the side of the road proved to be a bonanza for scavengers.

After 1851, travel to California along the southern route through the Colorado Desert declined. Horse traders and livestock drovers still used the trail to drive herds from Texas and Mexico to California and the U.S. Army continued to send caravans of provisions from San Diego to its outpost, Fort Yuma, at least until 1852. Emigrants, moving west, however, were more apt to be settling in southern California as farmers or ranchers instead of prospecting for mineral resources.

Desert Land Act, Entrymen, and Homesteading

Anglo-American homesteading and settlement in the Chuckwalla Valley was dependent upon the access to groundwater (Von Till Warren 1981). The first known documented well was that of Hank Brown, mapped as early as 1856, apparently excavated for use by the Department of Interior's General Land Office survey to establish the San Bernardino Base Line and Meridian through the then uncharted area. Washington, the surveyor noted the well was 45 feet deep and provided good water near the present day airfield northeast of Desert Center. Brown reportedly blazed a wagon road for the boundary surveys up Salt Creek Pass between the Orocopia and Chocolate Mountains and on toward present-day Desert Center.

Some twenty years later, Congress, to encourage and promote economic development of the arid public lands of the West, passed the Desert Land Act in 1877. Through this act, individuals could apply for entry onto public lands that could not produce a paying crop without artificial irrigation. After four years demonstrating proof of reclamation and improvements, desert entrymen would gain title to the land.

Brown's offspring, Floyd Brown, was probably one of the earliest participants in the desert land entry program. It does not appear that many others joined him until a quarter century later. In 1908, a subsidiary organization to the Edison Light and Power Company of Los Angeles, the Chuckwalla Land and Power Co., obtained a number of claims on the California side of the Colorado River north of Parker with the intent of building a dam to generate power and irrigate the Chuckwalla Valley, 40 miles to the west. By the following year, practically all the land in the valley was taken, either by purchase, desert claim, or homestead under the encouragement offered by the development company. The Santa Fe Railroad even had plans to build from Palo Verde through the heart of the valley. However, the Department of the Interior, of the opinion that it was a promoter's pipe dream, refused to sanction the scheme.

Four years later, the California Conservation Commission reported to the Governor and Legislature that while the power and irrigation project had been abandoned by the Chuckwalla Development Company, a group of 410 desert entrymen had formed the Chuckwalla Valley and Palo Verde Mesa Irrigation Association to proceed with the project independently. Most of these men were facing forfeiture of their lands and a loss on their investments, not being able to show final proof of securing water. The Senate and House Committees on Public Lands, recognizing their hardship, passed legislation granting them an extension (an exemption from cancellation for a period of one year) to give them time to carry out their plans. The Chuckwalla relief act benefited 780 entrymen, nearly 100 of whom were situated within the DHSP vicinity.

In 1909, at the start of the land rush, Brown's well was reportedly 300 feet deep, and plainly visible from the road, with two adobe buildings and a corral near it. A couple of years later, a man named Peter S. Gruendike settled in the valley. Gruendike's well is in the same general vicinity of Brown's and may be one-and-the-same. Gruendike was an active entryman, publish-

ing an account of his Mountain View Experimental Ranch in Out West in 1911. By then, he had a good 10-foot-tall windmill in working order and a large tank, along with many kinds of trees planted and 300 or more palms of different kinds. At the time, he was very enthusiastic regarding the future outlook, having visions of growing hay, grain, melons, grapes, dates, cotton, and all citrus fruits. His land was patented in 1916.

Stephen Ragsdale, a cotton farmer from Palo Verde Mesa, acquired Gruendike's property in 1915 and began operating a towing business at the establishment. Six years later, when Route 60 opened a mile or so to the north, he uprooted and founded the tiny settlement of Desert Center, midway between Indio and Blythe.

Roads and Highways Across the Chuckwalla Valley

Automobiles began seriously replacing buckboards (four-wheeled wagons drawn by a horses or mules) about 1910 (Von Till Warren 1980). Because of bad roads, the high-centered Model-T became the vehicle of choice. At that time, no maps, road signs, or service stations existed. Venturesome motorists in Southern California, faced with these circumstances, banded together in 1900 to form a touring club and began publishing a monthly magazine with tips on travel and directions to popular destinations. As desert driving could be perilous, motorists began advocating for better information and road assistance. In 1917, the U.S. Geological Survey erected signs directing travelers to water at 167 localities in California's desert. The California Department of Engineering, after paving its first auto road in 1912, began issuing maps in 1918.

In 1915, the Chuckwalla Valley Road, the east-west route across the valley, was essentially ninety miles of blow sand and cross washes with a couple of ruts. This route began as a single-track wagon road known as Brown's Road, and eventually developed into a paved two-lane automobile road known as U.S. Highway 60. It evolved progressively from the 1850s to the 1930s, and while its exact alignment changed slightly through time, it followed the same general path across the desert landscape in the vicinity of the town of Desert Center. Water wells along the route were developed to satisfy the needs of early travelers, and their importance continued through the automobile age. The town of Desert Center developed as a commercial enterprise along the route in the 1920s at the height of transnational highway development and popularity of scenic and historic tourist routes. Improvements for a safer and more drivable highway occurred in conjunction with the popularity of the southern desert regions in the 1920s and 1930s and the establishment of a series of numbered interstate highways that linked southern California with the rest of the country. U.S. Highways 66, 80, 91, 99, and 101 were established by 1926, connecting southern California to Chicago, Savannah, Montana, Canada, Mexico, and points east. U.S. 60, established by 1933, was one of the earliest transcontinental highways into southern California, linking Los Angeles to Norfolk, Virginia. U.S. Highway 60 would lend itself to the (not always) successful development of towns established along its route across southern California's Colorado Desert. The most prominent and long-lived of these "highway towns" was Desert Center. In 1968, this highway became Interstate 10 (I-10), a major transportation corridor through the Chuckwalla Valley today, connecting Los Angeles and Phoenix.

The predecessor of today's Rice Road (State Route 177) and the eastern portion of State Route 62 had been constructed and paved between Desert Center and Parker, Arizona by 1936. For several years this route was simply known as the Aqueduct Road, or Parker Dam Highway, and was built in support of the construction of the Colorado River Aqueduct in the 1930s. The CRA and the Aqueduct's power transmission line parallels this road for much of its distance, although

the Aqueduct itself is located some distance away. Camp Rice was established along this route a short distance to the east of the town of Rice in the spring of 1942 as one of General George S. Patton's 12 divisional camps of the Desert Training Center. The camp was situated along the south side of the road and immediately east of the Rice Army Air Field. Camp Coxcomb, Camp Iron Mountain, and Camp Granite were also established along this road during the period, 1942–1944. The highway provided access between these divisional camps during that time (Small-wood et al. 2012).

The Development of Desert Center

Today's town of Desert Center is situated along a segment of former U.S. Highway 60/70 (Rags-dale Road) near the intersection of Rice Road (State Route 177), and north of the Interstate 10 freeway. The town was a prominent "highway" town established by Steven Ragsdale in 1921. The café and service station were the center of his highway enterprise, but over time additional related buildings included the Ragsdale home, a store, an automotive garage, cabins with motel service, a school, and a post office. Development of the town was the result growth and construction fueled by an increase in tourism, a general interest in the desert by city-dwellers, and construction activity in the region associated with the highway, the Colorado River Aque-duct, mining, and the Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA).

Colorado River Aqueduct

The Colorado River Aqueduct (CRA) is a water conveyance system operated by the Metropol-itan Water District of Southern California. Construction began in 1933 and water first flowed through the system in 1941. The CRA system carries Colorado River water, impounded at Lake Havasu on the California-Arizona border, through, over, and across mountains and desert to the coastal and inland valleys of southern California. The CRA stretches 242 miles from Parker Dam to Lake Mathews (formerly known as Cajalco Reservoir). Water from Lake Mathews was then distributed to local water districts in the Los Angeles Basin and lower Santa Ana River drainage. The system is composed of two reservoirs, five pumping plants, 63 miles of canals, 92 miles of tunnels, and 84 miles of buried conduit and siphons. The nearest of these pump stations is the Eagle Mountain Pump Lift, located 7 mi north of Desert Center.

The project involved ingenious engineering solutions and newly introduced equipment at the time of its construction. It also employed over 35,000 people during an eight-year span of construction, and as many as 10,000 people at one time, making it southern California's single largest work opportunity during the Great Depression (Gruen 1998). Due to its many engineering merits, the CRA has been named a National Historic Civil Engineering Landmark by the American Society of Civil Engineers. Today, it is one of the principal water supplies for southern California.

In building the CRA, Metropolitan chose an aqueduct route that required four pump lift stations. A fifth was added when the Granite Mountains tunnel could not be easily holed-through. Each station was built with three pumps and the capability for expansion to nine pumps (Gruen 1998). Large amounts of electricity were required to operate the pumps, which necessitated construction of the transmission lines from Hoover Dam to the pump stations.

Construction of the transmission lines to power the system began in 1934 with the grading of dirt roads to provide access to the tower locations. The line is constructed of single H-frame steel

towers with cross supports. The contractor for construction of the transmission lines was Fritz Ziebarth of Long Beach. He established a construction camp at Camino where the steel towers were assembled using steel made in San Francisco. The steel was sent by rail to Goffs on the Santa Fe Railroad line and then by truck to CamiNo. Reinforced concrete footings were poured at each tower location and then the towers were erected on the footings. Erection of the towers began in February 1936 and the line from Hoover Dam to Iron Mountain Pump Lift was completed by the end of 1936. Construction of the line from Iron Mountain Pump Lift to Hayfield Pump Lift was completed in July, 1937 (Gruen 1998).

Hydroelectric Power Transmission

During the late nineteenth century, history was made generating and transmitting electricity in Southern California's Inland Empire (Taylor 2005). Pioneer engineers and entrepreneurs took the industry's first steps toward large capacity power plants and long distance power transmission nearly 125 years ago. Charles R. Lloyd and Gustavus Olivio Newman built California's first hydroelectric power plant in western Riverside County in 1887. It relied upon water from a canal in Highgrove at the base of a 50-foot elevation drop. It began by powering 30 outdoor arc lights (15 in Colton and 15 in Riverside) from a direct current dynamo.

In the early 1890s, direct current (DC) relied upon a distributed system involving many power plants and numerous short transmission lines because it was not practical to vary the voltage to meet differing consumer requirements for lighting and motorized appliances. Further, DC systems were inefficient because low-voltage transmission necessitated conveyance of high-currents through resistive conducting wires resulting in large energy losses. In contrast, alternating current (AC) relied upon a centralized system involving fewer power plants, long-distance transmission lines, and transformers to step down the voltage, essentially enabling the conveyance of high-voltages at low-currents, thereby reducing resistance and energy loss.

In September of 1893, while the dominant electric companies were fighting over the emerging electric power standards (DC versus AC), the small community of Redlands, in San Bernardino County, managed to engineer and complete the first commercially viable power plant in the United States. With the foresight of Almarian Decker, long-distance electric power transmission was achieved via transformers and the development of a revolutionary three-phase AC generator. Decker's power generation and delivery system was so successful that it became the Southern California standard.

Hydroelectricity, referred to as "white coal," was a clean and inexpensive source of power that enabled industrial capitalism to take hold in the West. Engineers began to dam western rivers for electricity in the 1890s, just as the hydraulic mining industry declined. Citizens, politicians, and reformers viewed electricity as a necessity that would dramatically uplift the country's standard of living. Water and power companies like Edison Light and Power Company of Los Angeles (later known as Southern California Edison), seeing big money, made every effort to control the stakes.

Before 1913, the highest voltage lines in the Los Angeles area were operated in the 10 to 75 kV range. Some of the earliest distribution lines were built to serve rural communities. During the 1930s, any circuits built were those that extended lines constructed a decade earlier. Many of these lines focused on following railroad spur lines and existing distribution lines to growing communities.

The first electricity came to Blythe in 1917. Two 50 watt diesel engines generated power 18 hours a day. It was not until 1930 that this system was abandoned when a 70 mile-long transmission line was constructed connecting Blythe with Calipatria in the Imperial Valley, where the line's main system was located. In the 1950s, the Blythe-Eagle transmission line was constructed. It was a 161 kV transmission line that connected the Blythe-Eagle Mountain Substation in Blythe to a substation near Eagle Mountain. The other transmission line in the vicinity of the DHSP is the Devers-Palo Verde- line, a 500 kV lattice-tower transmission line constructed in 1982. It connects a plant in Arizona with a substation near Palm Springs.

Mining

Riverside County is known mostly for its sporadic, small-scale mining of gold, silver, lead, copper, uranium, fluorite, and manganese. Large numbers of prospectors were attracted to the region during the gold boom in La Paz (in western Arizona, 6 miles north of present-day Ehrenberg) in 1862. Not long after, miners began combing the mountains on either side of the Chuckwalla Valley. Gold was being mined as early as 1865 in the Eagle Mountain District. Much later, in the late 1940s, Kaiser Steel began a large-scale iron ore mining operation in the Eagle Mountains. The iron ore deposit was discovered by geologists during the construction of the CRA in the early 1930s, and the mine reached its peak of production during WWII as one of the largest open-pit mines in the world. The Eagle Mountain Mine and the adjacent townsite of Eagle Mountain played a significant role in the war effort during World War II and in the subsequent development of the local area. Eagle Mountain Railroad was constructed between August 1947 and 1948 to haul ore from the Kaiser Steel-owned mine at Eagle Mountain to the Southern Pacific Railroad siding at Ferrum near the northeastern shore of the Salton Sea. It stretched 51 mi from Ferrum to its terminus at Eagle Mountain Mine, and was one of the longest privately built standard gauge railroads in the American southwest during the post-war era. Kaiser Road is a paved road that provided access to Eagle Mountain Mine and the community of Eagle Mountain from Desert Center. Kaiser Road was constructed between 1957 and 1963. Prior to that, vehicle access to Eagle Mountain Mine and the Eagle Mountain community was provided via Eagle Mountain Road. Kaiser Road was constructed by Kaiser Steel to provide access to Eagle Mountain Mine and the community of Eagle Mountain.

In the Granite Mountains to the north-northwest, there was a short stint of gold mining beginning in 1894, followed by a resurgence in the late 1920s by the Chuckwalla Mining and Milling Corporation. Copper mining occurred in the Palen Mountains to the northwest during the second decade of the twentieth century, by the Fluor Spar Group, Homestake Group, Crescent Copper Group, Orphan Boy, and Ophir mines. Most of these mines were abandoned by 1917.

The short-lived Pacific Mining District was established in 1887, in the Chuckwalla Mountains, following gold and silver discoveries that caused the most substantial rush to Riverside County in its history. Sixty claims were filed by the end of the year, but the boom fizzled by 1890 because the owners never had enough capital to work them properly. About 1898, some 40 claims in the area were taken up by the Red Cloud Mining Company. In 1901, a force of 50 men worked there. The company installed a new hoist and a 30 ton mill, and was raising money through stock offerings to construct a tram from the mine to the mill. The company changed hands some time before 1915, however, and soon folded. Just prior to this, half-a-dozen prospectors began working the Chuckwalla Placer Diggings near Chuckwalla Springs. This

lasted about fifteen years. The Red Cloud Mine was later resurrected, in 1931, when a small amalgamation plant was built, and continued operations until 1945.

Military Activities

Desert Training Center. In 1942, during World War II, Gen. George S. Patton established the Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA) in a sparsely populated region of southeastern California, Arizona, and Nevada. Its purpose was to prepare tank, infantry, and air units for the harsh conditions of North Africa, practicing maneuvers, developing tactics, and field testing equipment. The installation, in operation for two years (until the end of the war), was 16,000 square miles in extent. It was the first simulated theater of operations in the United States. Its location was chosen for its unforgiving desert heat, rugged terrain, available telephone communications system, and accessibility by established railroads and highways (Bischoff 2001; Bischoff et al. 2010).

Seven camps were established for divisional use. Camp Young, near Indio, served as the main headquarters. Camp Desert Center was located between Chiriaco Summit and the community of Desert Center. It encompassed 34,000 acres, consisting of an encampment with temporary housing structures, an evacuation hospital, observers' camp, an ordnance campsite, quartermaster truck site, and maneuver area. The Desert Center Airport, formerly the Desert Center Army Air Field, also known as the Airdrome, was built in 1942 as a sub base to Thermal Army Airfield, and is located approximately three miles southeast of the DHSP. Historical research indicated that a detachment of the 475th Base Headquarters & Air Base Squadron was the first administrative unit stationed at the airfield, arriving on January 15, 1943 (Bischoff 2000:92–93). The airfield was described as having 5,500 feet of runways, taxiways, a parking apron, and more than 40 buildings, 61 including an operations building, power house, Link Trainer building, hangar and supply buildings. The 74th Reconnaissance Group arrived at the airfield in December of 1942 while the base was still under construction and was equipped with O-52s, L-1s, L-4s, B-25s, P-39s, and P-40s. Desert Center Army Airfield opened in April of 1943 and the 3rd Airdrome Detachment was activated on August 1, 1943. After the defeat of Rommel's army in the African desert, the training area was closed in 1944 and the airfield was assigned to the Fourth Air Force, which continued to use the field for training operations for B-24 Liberator crews operating out of March Field, in western Riverside County. In 1946, under the control of the Army Corps of Engineers, many of the buildings at the airfield were declared surplus and auctioned off to the public, and the airfield was eventually closed.

In 1986, BLM planned to nominate each of the seven division camps to the NRHP, to develop an interpretive program for the DTC/C-AMA, and to provide historical resources protection through designation as an Area of Critical Concern (ACEC) (Bischoff 2000, p. 134). Subsequently, Bischoff (2000, p. 133), in considering the historical and archaeological contexts for the DTC/C-AMA, found that it was a historically significant resource under all four criteria of the NRHP. As such, he recommended that the facility be nominated to the NRHP as a discontiguous district of clearly functionally and temporally related resources. He further proposed that the facility be recorded as multiple properties consisting of contributing and noncontributing elements of the district. DTC/C-AMA can be thought of as an interconnected landscape of WWII training sites that are highly significant for their association with Gen. George S. Patton and for their contributions to our understanding of how American soldiers were trained during WWII.

Recently, the DTC/C-AMA has been a focus of a research project as part of cumulative impact mitigation associated with the Blythe Solar Power Project, Genesis Solar Energy Project, and Palen Solar Power Project (Bischoff et al. 2010). As part of this study a context, field manual, and Multiple Property Nomination to the NRHP are being prepared. These documents are intended to standardize the way DTC/C-AMA sites, features, and artifacts are recorded, analyzed, and evaluated for eligibility for listing on the NRHP and CRHR. In addition, research questions specific to WWII era training were developed.

Desert Strike. During the Cold War years, relations between the United States and the Soviet Union were fragile (U.S. Strike Command n.d.). While a campaign promoting the nonproliferation of nuclear weapons began in 1958, a treaty was not signed until 1970. Thus, amid worries of nuclear war, a two-week training exercise was launched in 1964, called Desert Strike. It involved over 100,000 men, 780 aircraft, 1,000 tanks, and 7,000 other vehicles along the banks the Colorado River and adjoining desert valleys ranging over 150,000 square miles of California, Nevada, and Arizona. Four Army divisions, three Army Reserve and National Guard brigades, and fifteen tactical Air Force squadrons took part.

The exercise was a two-sided enactment, with fictitious world powers "Calonia" and "Nezona" sharing a common border at the Colorado River. The premise of the conflict between these two entities, each led by a Joint Task Force, was a dispute over water rights. Major tactical operations during the exercise included deep armored offensive thrusts, defensive operations along natural barriers, counterattacks including airmobile and airborne assaults, and the simulated use of nuclear weapons. The Air Force provided fighter, air defense, interdiction, counter-air reconnaissance, and troop carrier operations in support of both joint task forces.

In the first phase of Desert Strike, Calonia initiated mock battle with a full-scale invasion of Nezona. A new concept for military river crossings was put into operation during this invasion, accomplished with a combination of assault boats, amphibious armored personnel carriers, ferries, bridges, and fords at eight major sites along a 140-mile stretch of the Colorado River. The practice of attack and counterattack continued into a second phase, in which simulated nuclear strikes and airborne assaults were traded between the forces. Heavy equipment, such as the M60 tank, was used during practice maneuvers, and the track marks can still be seen across the desert.

Identified Cultural Resources

Class I Inventory

The Class I overview is a summary of literature, records, and other documents providing an informed basis for understanding the nature of the cultural resources of the study area. The original Class I review only covered the northeastern, 1,052-acre solar field site and a one mile buffer surrounding it (Auck 2010). This search was later expanded to include the southwestern solar field parcel and gen-tie line Alternatives B/C, D, and E (Akyuz 2012a, 2012b). The results of the records search/literature review indicate that 36 cultural resources inventories have been conducted within one mile of the proposed APE, and 353 cultural resources including those for the DSSF have been recorded in this same area.

BLM Class III Survey

BLM Class III cultural resource inventories of about 96% of the DHSP APE have been completed. Portions of Alternative D and Alternative E that are located on privately owned land have not yet been surveyed due to site access restrictions (105.3 acres). Site access restrictions are an allowable reason to forego Class III surveys under both NEPA and CEQA. Inventories of the following project components have been completed:

1. The main project footprint was surveyed by Chambers Group in August of 2011 (Akyuz 2012a);
2. Portions of transmission line Alternative B/C, referred to as Alternative A-1 in DSSF documents, was surveyed by AECOM and ECORP in 2010 (Chandler et al. 2010);
3. Portions of transmission line Alternative D, referred to as Alternative A-2 in DSSF documents, was surveyed by AECOM and ECORP in 2010 in (Chandler et al. 2010);
4. Portions of transmission line Alternative E was surveyed by the Chambers Group in October of 2011 (Akyuz 2012a).
5. Additional recordation and analysis was conducted by Applied Earthworks (Æ) in December of 2011 and April of 2012 (Akyuz 2012b).
6. An historic built-environment and indirect effects survey was conducted by Applied Earthworks (Æ) in April of 2012 (Smallwood et al. 2012).
7. A portion of transmission line Alternative B/C was revisited by ECORP in July 2012 (Chandler 2012).

A total of 62 new archaeological sites were found during these field inventories. These included 7 prehistoric resources, 42 historic-period resources, 2 multicomponent resources, and 11 of unknown temporal affiliation. Five of the sites documented by Chandler (2012) were not located within the APE, and consequently are not reflected in Table 3.6-1. The public is being provided an opportunity to review the results of these surveys and provide comments on the findings during the 30-day public circulation period provided for a Final EIS under NEPA.

Resources Identified within DHSP Components and in the Vicinity

A total of 64 cultural resources (including archaeological sites, built environment resources, and historic districts) are present within the DHSP components, and the immediate vicinity, that have been inventoried to date. These include eight prehistoric resources,43 historic resources, 2 multicomponent resources, and 11 of unknown temporal affiliation. No human remains have been identified as components of these resources. As discussed previously, only adverse effects to resources that BLM has determined are eligible for th NRHP or resources that are unevaluated must be mitigated. It should be noted that Alternative B/C and Alternative D have some overlap. As a result, there are 2 sites which are present in both alternatives (P-33-18299 and P-33-18307). Therefore, the total number of sites documented in, or in proximity to, all alternatives and the solar field, in addition to the indirectly affected sites and historic districts, will be higher than 64 because these 2 sites are *not* counted twice in the total number of cultural resources. All of these resources are located within the boundaries of two large, overlapping proposed historic districts

(Akyuz 2012a, 2012b; Goldberg and McDougall 2012; Chandler et al. 2010). These resources are summarized below.

Resources Associated with all DHSP Components – Historic Districts

All of the project components have been determined to be within the boundaries of two potential historic districts. Historic districts are a grouping of sites, buildings, structures, or objects that are linked historically by function, theme, or physical development or aesthetically by plan.

The BLM and more recently the Energy Commission have proposed the designation of a contiguous historic district that incorporates historical archaeological sites associated with Gen. Patton's World War II Desert Training Center California-Arizona Maneuver Area (DTC/C-AMA). In Energy Commission documents, the proposed district is known as the Desert Training Center Cultural Landscape (DTCCL). Depots, airfields, ranges, bivouacs, maneuver areas, camps, and hospitals are among some of the property types included in the proposed district (Bischoff et al. 2010).

Energy Commission staff have also proposed the designation of a noncontiguous historic district that incorporates prehistoric archaeological sites associated with the Halchidhoma (or Coco-Maricopa) Trail (CA-Riv-0053T). In Energy Commission documents this proposed district is referred to as the Prehistoric Trails Network Cultural Landscape (PTNCL). This proposed district would consist of important destinations in the Colorado Desert within and in the vicinity of the Chuckwalla Valley, California, the network of trails that tie them together, and the features and sites associated with the trails (Laylander and Schaefer 2010). Some potential contributors to the PTNCL in the vicinity of the DHSP include: the Halchidhoma Trail, North Chuckwalla Mountains Petroglyph District and other sites in the Alligator Rock ACEC.

Resources Identified Within Particular DHSP Components

Solar Facility Site. Resources identified on the solar facility site consist primarily of isolated artifacts. These isolates included C-ration cans and soluble coffee cans associated with the WWII-era DTC/C-AMA. These isolated artifacts have been moved through fluvial and wind processes, and thus are no longer in primary context.

One new site, AE-2316-1, and multiple isolates were identified within the solar facility site. The site consists of a prehistoric "pot drop" feature represented by nine sherds of Parker Buff pottery, all from a single vessel. This site has been determined to not be eligible for listing in the National Register of Historic Places (NRHP) (Akyüz 2012b).

Gen-Tie Line Corridors. Alternative B/C – This proposed transmission corridor includes 28 sites (four prehistoric, sixteen historic, two multicomponent, and 6 of unknown temporal affiliation). The majority of these sites were recorded as part of the DSSF project (Chandler et al. 2010, Chandler 2012). Ten of these resources have been formally evaluated by BLM (Chandler et al. 2011; Kalish 2012). The sites and the results of these formal evaluations are listed in Table 3.6-1.

Alternative D – Survey crews could not access 98.3 acres (43.5%) of the proposed Alternative D corridor. For those portions of the corridor which were surveyed, six historic sites were identified. Five of these sites were recorded as part of the DSSP Class III survey. ECORP (Chandler et al. 2011). Two of these resources have been formally evaluated by BLM (Chandler et al.

2011; Kalish 2012). The sites' BLM eligibility determinations are listed in Table 3.6-1, with sites determined eligible listed in bold.

Alternative E – Survey crews could not access 7.04 (2.8%) acres of the proposed Alternative E corridor. During the pedestrian survey for the current project one previously recorded historic road segment and seven new historic sites were identified (Akyüz 2012b). None of these resources have been formally evaluated by BLM. These sites are listed in Table 3.6-1.

Table 3.6-1. Cultural Resources Identified Within the Proposed Solar Facility Site and Portions of Alternatives B, C, D, and E

Within Portion of APE	Primary Number (P-33-)	Trinomial (CA-RIV-)	Description	NRHP Eligibility Recommendations	Land Jurisdiction for Environmental Review
Alternative B/C	15093	NA	Prehistoric 50+ quartz debitage	Determined Not Eligible	BLM
Alternative B/C	15095	9385	Historic: hundreds of discrete refuse deposits: 1929-1980s	Determined Eligible	BLM/County ROW
Alternative B/C	18244	NA	Historic refuse scatter of four cans	Determined Not Eligible	County ROW
Alternative B/C	18245	9382	Historic refuse scatter: multiple use roadside refuse deposit	Determined Not Eligible	County ROW
Alternative B/C	18246	NA	Historic excavated area; potentially a prospecting area	Determined Not Eligible	County ROW
Alternative B/C	18249	9383	Historic prospect pit and associated push pile	Not evaluated	BLM
Alternative B/C	18253	NA	Historic refuse scatter of over 30 cans	Determined Not Eligible	County ROW
Alternative B/C	18263	9390	Historic refuse scatter of 40 cans	Recommended Not Eligible	BLM
Alternative B/C	18268	NA	Prehistoric lithic concentration	Not evaluated	BLM
Alternative B/C	18269	9394	Prehistoric lithic debris scatter, three lithic and postherds concentrations	Not evaluated	BLM
Alternative B/C	18271		Historic-period refuse deposit: 200+ hole-in-top ilk cans, 200+ sanitary cans	Determined Not Eligible	BLM
Alternative B/C	18291	NA	Historic refuse scatter of 6 cans	Determined Not Eligible	BLM
Alternative B/C	18292	9407	Prehistoric short-term habitation area with two artifact concentra-tions: lithic scatter, potsherds, and fire affected rock	Recommended Not Eligible	BLM
Alternative B/C	18404	9483	Historic refuse deposit	Not evaluated	BLM
Alternative B/C	18405	NA	Historic-period placer mining disturbance, one rock cairn feature, one hole-in-top milk can	Determined Not Eligible	BLM
Alternative B/C	19471	9910	Historic refuse deposit	Not evaluated	BLM
Alternative B/C	18249	9383	Historic prospect pile and associated push pit	Not evaluated	County ROW
Alternative B/C	DH-001	NA	Rock ring	Assumed Eligible	BLM
Alternative B/C	DH-002	NA	Rock ring	Assumed Eligible	BLM
Alternative B/C	DH-006	NA	Four cleared circles	Assumed Eligible	BLM
Alternative B/C	DH-008	NA	Four cleared circles and a backfilled pit	Assumed Eligible	BLM

Table 3.6-1. Cultural Resources Identified Within the Proposed Solar Facility Site and Portions of Alternatives B, C, D, and E

Within Portion of APE	Primary Number (P-33-)	Trinomial (CA-RIV-)	Description	NRHP Eligibility Recommendations	Land Jurisdiction for Environmental Review
Alternative B/C	DH-009	NA	Seven historic and unknown temporal affiliation cleared circles	Assumed Eligible	BLM
Alternative B/C	DH-012	NA	Cleared circle	Assumed Eligible	BLM
Alternative B/C	DH-051	NA	Historic refuse deposit	Recommended Not Eligible	BLM
Alternative B/C	DH-052	NA	Historic refuse deposit and prehistoric quartz reduction locus	Recommended Not Eligible	BLM
Alternative B/C	DH-100	NA	Two cleared circles	Assumed Eligible	BLM
Alternative B/C–Alternative D Overlap	18299	NA	Historic refuse scatter	Determined Not Eligible	BLM
Alternative B/C–Alternative D Overlap	18307	NA	Historic rock feature; one foot tall pile of 50 granitic and quartzite boulders	Not evaluated	BLM
Alternative D	18391	NA	Sparse historic refuse scatter: spent military ordnance	Not evaluated	BLM
Alternative D	18392	NA	Moderately Dense historic scatter associated with DTC 1942-1944	Determined Eligible	BLM
Alternative D	18393	9481	Historic foundation associated with DTC 1942-1944	Not Evaluated	BLM
Alternative D			AE-DH-7H – Historic oiled road	Recommended Not Eligible	BLM
Alternative E	18315	NA	Historic highway markers and associated berm	Not evaluated	BLM
Alternative E			Site 1 – Historic refuse scatter, WWII era	Not evaluated	BLM
Alternative E			Site 2 – Historic low earthen ramp	Not evaluated	BLM
Alternative E			Site 3 – Historic road segment	Not evaluated	BLM
Alternative E			Site 4 – Historic refuse Scatter, modern era	Not evaluated	MWD
Alternative E			Site 5 – Historic refuse scatter 1880-1930	Not evaluated	BLM
Alternative E			AE-DH-1H – Historic refuse scatter	Not evaluated	MWD
Alternative E			AE-DH-5H – Historic refuse scatter associated with DTC 1942-1944	Recommended Not Eligible	MWD
Solar Field			Æ-2316-1 – Prehistoric pot drop	Recommended Not Eligible	BLM

Resources Identified in the Vicinity of DHSP Components

A total of 20 cultural resources are present in the vicinity of DHSP components and may be subject to indirect effects. These include the North Chuckwalla Petroglyph District (CA-RIV-1383, NRHP-listed), the North Chuckwalla Mountains Quarry District (CA-RIV-1814, NRHP-listed), segments of the Coco-Maricopa Trail (CA-RIV-053T), and 17 historic period built-environment resources (Smallwood et al. 2012). All of these resources have been formally evaluated by BLM (Kalish 2012). These resources are summarized below (Table 3.6-2).

Table 3.6-2. Cultural Resources Present in the Vicinity of DHSP Subject to Indirect Effects

Primary Number (P-33-)	Trinomial (CA-RIV-)	Description	NRHP Eligibility Recommendations
017766		Former U.S. Highway 60/70	Eligible
005717		Desert Center Café and associated buildings and structures	Eligible
005718		Desert Center post office, country store, and church	Not eligible
005719		Two stump ranch shanties and an outhouse in Desert Center	Not eligible
005721		Eight apartment buildings ("Hollywood Cabins") in Desert Center	Not eligible
006832		Ragsdale House in Desert Center	Eligible
006833		Old School House/Desert Center School	Not eligible
		New Desert Center School	Not eligible
		State Route 177 (Rice Road)	Not eligible
		CRA Transmission Lines	Contributing to eligibility of a potential CRA district
		Eagle Mountain Pumping Plant	Contributing to eligibility of a potential CRA district
		DTC/C-AMA	Eligible
		Desert Center Army Airfield/Airport	Not eligible
		Eagle Mountain Railroad	Eligible
		Kaiser Road	Not eligible
		Blythe-Eagle Mountain Transmission Line	Not eligible
013987		Southern California Telegraph Company Pole Line	Not eligible
	053T	Segments of Coco-Maricopa Trail	Eligible
	1383	North Chuckwalla Mountains Petroglyph District	Listed
	1814	North Chuckwalla Mountains Quarry District	Listed

3.7 PALEONTOLOGY

This section describes the existing paleontological resources and the possibility of discovery of fossil resources within in the area where the Proposed Action and alternatives would be implemented. The project study area for paleontology encompasses all resources that could be affected by ground disturbance related to the construction, operation, and decommissioning of the Desert Harvest Solar Project (DHSP).

Paleontological resources are any fossilized remains, traces, or imprints of organisms that are preserved in the Earth's crust and are of paleontological interest and provide information about the history of life on Earth. Fossil remains may include bones, teeth, shells, leaves, and wood. They are found in geological deposits within which they were originally buried. Paleontological resources include not only the actual fossils, but also the collecting localities and the geological deposits that contain the fossils. Paleontological resources are considered nonrenewable resources because the organisms they represent no longer exist. Thus, once destroyed, these resources can never be replaced.

This section is based on the Potential Fossil Yield Classification Study (Roeder 2011) conducted for the entire DHSP, and two Paleontological Resources Assessments (Roeder 2012a, 2012b) which include the results of field studies of the proposed solar facility site and those portions of gen-tie line Alternative B, C, D, and E that fall on BLM-administered land. In addition, this section relies upon a paleontological assessment conducted by ECORP for the Desert Sunlight Solar Farm (DSSF) project, as incorporated by reference in Section 1.11, that describes fieldwork conducted at the adjacent solar facility site and on portions of gen-tie line Alternatives B and C (Aron and Kelley 2011). Paleontological field assessments of those portions of the gen-tie alternatives which fall on Metropolitan Water District of Southern California (MWDSC) land have not been conducted due to site access constraints; however, land access is being acquired, and, if available, the results of surveys will be incorporated into the Record of Decision. Although this limitation does not allow for a full comparison of effects across alternatives, given the site constraints this circumstance is allowable under NEPA.

3.7.1 Applicable Plans, Policies, and Regulations

Paleontological resources are afforded protection under state and federal environmental laws most notably by the 1906 Federal Antiquities Act, the 2009 Paleontological Resources Preservation Act (PRPA), other subsequent federal legislation and policies, and by the State of California's Environmental Quality Act (CEQA, Section 15064.5). Professional standards for assessment and mitigation of adverse impacts on paleontological remains have been established by the Society of Vertebrate Paleontology (SVP 1995).

Federal

Paleontological Resources Preservation Act of 2009

The PRPA was signed into law as part of the Omnibus Public Lands Management Act (OPLMA) of 2009. The OPLMA-PRP requires the Secretary of the Interior to manage and protect paleontological resources on federal land using scientific principles and expertise, and requires the BLM to develop appropriate plans for inventorying, monitoring, and the scientific and educational use of paleontological resources, in accordance with applicable agency laws, regulations, and policies. Where possible, these plans should emphasize interagency coordination and

collaborative efforts with non-federal partners, the scientific community, and the general public. The OPLMA-PRP is the new authority for the Department of the Interior (DOI) and USDA Forest Service for permits to collect paleontological resources as well as curation of these resources in an approved repository.

Antiquities Act of 1906

The Antiquities Act was the first law enacted to specifically establish that archaeological sites on public lands are important public resources, and it obligated federal agencies that manage public lands to preserve the scientific, commemorative, and cultural values of such sites. This act does not refer to paleontological resources specifically; however, the act does provide for protection of "objects of antiquity" (understood to include paleontological resources) by various federal agencies not covered by the OPLMA-PRP.

Federal Land Policy and Management Act of 1976 as Amended

The Federal Land Policy and Management Act of 1976 requires the Secretary of the Interior to retain and maintain public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric water resource, and archeological values [Section 1701(a)(8)].

Bureau of Land Management Plans and Guidelines

California Desert Conservation Area Plan

With respect to paleontological resources (discussed in the Cultural Resource Element), the CDCA Plan aims to: (1) ensure that paleontological resources are given full consideration in land use planning and management decisions, (2) preserve and protect a representative sample of the full array of the CDCA's paleontological resources, and (3) ensure proper data recovery of significant paleontological resources where adverse impacts cannot be avoided or otherwise mitigated.

BLM Instruction Memorandum (IM) 2008-009 and 2009-011

This BLM memorandum formalizes the use of a new classification system for identifying fossil potential on public lands. The Potential Fossil Yield Classification (PFYC) system is based on the potential for the occurrence of significant paleontological resources in a geologic unit, and the associated risk for impacts to the resource based on federal management actions. Occurrences of paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment.

Using the PFYC system, geologic units are classified (Class 1 – Very Low through Class 5 – Very High) based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. It is used to set management policies and not intended to be applied to specific paleontological localities or small areas within units.

As defined in IM 2009-011, *Assessment and Mitigation of Potential Impacts to Paleontological Resources*, Appendix A, a significant paleontological resource is any resource that is considered to be of scientific interest, including most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils. A significant resource is considered to be scientifically important because it is a rare or previously unknown species, it is of high quality and well-preserved, it preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has identified educational or recreational value. Paleontological resources that may be considered to not have paleontological significance include those that lack provenience or context, lack physical integrity because of decay or natural erosion, or that are overly redundant or are otherwise not useful for research.

BLM Manuals and Handbooks

BLM Manual 8270 and BLM Handbook H-8270-1 contain the agency's guidance for managing paleontological resources on public land. The manual has more information on the authorities and regulations related to paleontological resources. The handbook gives procedures for permit issuance, requirements for qualified applicants, information on paleontology and planning, and a classification system for potential fossil-bearing geologic formations on public lands. This classification system was superseded by IM-2008-009. The manual and handbook policy and guidance are still in effect until such time the final regulations under the OPLMA-PRP are promulgated and the manual and handbook are updated.

State

California Environmental Quality Act

Paleontologic resources are afforded protection by environmental legislation set forth under CEQA. Appendix G (part V) of the CEQA Guidelines provides guidance relative to significant impacts on paleontological resources, indicating that a project would have a significant impact on paleontological resources if it will disturb or destroy a unique paleontological resource, site, or unique geological feature.

California Public Resources Code

Section 5097.5 specifies that any unauthorized removal of paleontological remains is a misdemeanor.

California Penal Code

Section 622.5 sets the penalties for damage or removal of paleontological resources.

Riverside County

Riverside County General Plan

The following policies outlined in the General Plan provide direction for paleontological resources:

OS 19.8 – Whenever existing information indicates that a site proposed for development may contain biological, paleontological, or other scientific resources, a report shall be filed stating the

extent and potential significance of the resources that may exist within the proposed development and appropriate measures through which the impacts of development may be mitigated.

OS 19.9 – This policy requires that when existing information indicates that a site proposed for development may contain paleontological resources, a paleontologist shall monitor site grading activities, with the authority to halt grading to collect uncovered paleontological resources, curate any resources collected with an appropriate repository, and file a report with the Planning Department documenting any paleontological resources that are found during the course of site grading.

OS 19.10 – Transmit significant development applications subject to CEQA to the San Bernardino County Museum for review, comment, and/or preparation of recommended conditions of approval with regard to paleontological resources.

3.7.2 Existing Conditions

The land comprising the proposed project site is located in the Desert Center area of Riverside County, California. The proposed project and its alternatives occupy approximately 1,200 acres within a relatively broad and undeveloped basin in the northern portion of Chuckwalla Valley. This region is at the juncture of three geologic provinces in eastern southern California, the Transverse Ranges, Salton Trough, and Mojave Desert. The site is bordered to the west by the Eagle Mountains, to the northeast by the Coxcomb Mountains, and to the south by the continuation of the Chuckwalla Valley. Three ephemeral washes are within the DHSP study area: Pinto Wash, Big Wash, and Eagle Creek. All three are located to the north and west of the proposed solar facility boundary line. Several unpaved roads transect portions of this area. Vegetation in the area generally consists of creosote, sage, and similar plant communities of the southern California deserts. Elevation at the proposed solar facility site is approximately 600 feet above mean sea level (amsl). Development in the surrounding area includes the rural community of Desert Center, California; Lake Tamarisk Desert Resort; the Eagle Mountain Mine; and Desert Sunlight, an approved neighboring solar project. The environmental baseline for the proposed project and alternatives includes only the preliminary construction of the Desert Sunlight Solar Project that had been completed in September 2011. Joshua Tree National Park, which is managed by the National Park Service and is largely designated as wilderness, surrounds the majority of the DHSP to the west, north, and east.

Previously Identified Paleontological Resources in the DHSP Vicinity

A region of several miles surrounding the proposed solar facility site and gen-tie alternatives was evaluated for the recorded presence of paleontological resources and the potential for the geologic units in the region to contain significant paleontological resources. This evaluation consisted of three parts: a literature review, a records search, and contacting local experts (Roeder 2011). The literature review included a detailed examination of geologic maps of the area. In addition, pertinent published literature and unpublished manuscripts on the geology and paleontology of eastern Riverside County were reviewed. In order to gather existing paleontological resource data in the proposed project area, available published resources were consulted, including books, journals, and maps, and information available via the internet on government websites. An online search was also conducted for paleontological assessments conducted within the proposed project boundaries and surrounding areas. Of particular interest were the survey and construction monitoring reports associated with the nearby projects in the Chuck-

walla Valley including: DSSF, Rio Mesa Solar Energy Generating Facility (RMSEGF), Palen Solar Energy Project (PSEP), Genesis Solar Energy Project (GSEP), and the Devers–Palo Verde No. 2 Transmission Line Project (DPV2).

Second, a records search at the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County and at the UC Berkeley Museum of Paleontology was completed. Museum collection records were searched to determine whether there are any known fossil localities in or near the boundaries of the proposed project area. Also the records search identified information on the geologic units present in the proposed project area, and helped in determining the paleontological sensitivity rating of those geologic units to assess potential impacts to nonrenewable paleontological resources.

Finally, Mr. Robert (Bob) E. Reynolds formerly of the Department of Earth Sciences, San Bernardino County Museum, and Dr. J. D. Stewart of URS Corporation were interviewed on the geology and paleontological resources of the study area.

The review of previous paleontological research conducted in the DHSP vicinity showed that the region is poorly understood. Very few comprehensive studies have taken place, and few finds have been reported to local museums. A search of the vertebrate paleontological records of the Natural History Museum of Los Angeles County (LACM) indicates that there are no known paleontological resources within in the study area. However, vertebrate fossil localities have been identified in the vicinity within the same or similar sedimentary deposits. East-southeast of the proposed project area, north of Interstate 10, and on the southwest side of Ford Dry Lake, LACM locality 5977 yielded a fossil specimen of a pocket mouse (*Perognathus)*. North-northwest of the proposed project between the Eagle and Coxcomb Mountains, older Quaternary deposits in the Pinto Formation yielded fossil specimens of tortoise (*Gopherus)*, horse (*Equus)*, and camel (*Camelops* and *Tanupolama stevensi)* from fossil localities LACM (CIT) 208 and LACM 3414. In addition, Joshua Tree National Park notes that there are paleontological deposits in the vicinity of the proposed project area within the Park boundaries (NPS 2011).

More recently, there has been an influx of paleontological information associated with the large energy projects proposed and under construction in the Chuckwalla Valley and the Palo Verde Mesa. Originally, the low number of finds in the project vicinity was interpreted as an indication of low sensitivity. However, paleontological field survey and construction monitoring associated with these large projects in the last decade have consistently identified significant paleontological resources in both surface and buried contexts. For example, during construction of the GSEP project paleontological monitors have found multiple vertebrate fossils, primarily tortoise carapace and bones. Multiple studies have identified paleosols (old soil horizons) within the Quaternary alluvium of the region. These horizons formed slowly through mechanical and chemical erosion during wetter periods in the Late Pleistocene of the Colorado Desert. These conditions are very favorable for the preservation of fossils, especially short-lived species such as rodents. These paleosols have been identified below desert pavement in the southern Chuckwalla Valley (Reynolds 2012), south of Interstate 10 near State Route 177 (Reynolds 2011), and at the RMSEGF (Stewart et al 2012). In his paleontological assessment of the proposed RMSEGF Stewart and his colleagues (2012) recognized at least two paleosols between six and seven feet below the modern ground surface of the Palo Verde Mesa. These reddish-brown paleosols containing whitish caliche masses extend for more than 13 miles, possibly indicating

the presence of a buried regional surface. AMS radiocarbon dates from fossil tortoise shell fragments indicates the paleosol is approximately 13,000 years old (Roeder 2012b).

Finally, a paleontological study was produced as part of the Desert Sunlight Solar Farm, immediately to the north of the solar facility. This study inferred that alluvial sheet wash deposits consisting of gravelly (pebble) sands covering the DSSF were less than 500 years in age. Also young alluvial deposits which consisted of silty sand and sand, with minor amount of sandy pebble gravels dated less than 1000 years (ECORP Consulting, Inc. 2010). This study also identified older alluvial fan deposits consisting of coarse sandy cobbly gravel with strong pavement development and varnish formation. Based on comparisons to other dated alluvial fan deposits in the area, the area in question has an inferred age of late Pleistocene (>12,000 years before present). The field study for the proposed project examined older Pleistocene deposits but not Quaternary alluvium. No paleontological resources were observed. However, during construction, paleontological monitors have identified several significant vertebrate fossils including tortoise (*Gopherus*), horse (*Equus*), and camel.

Related to this work, the Riverside County Transportation and Land Management Agency (TLMA) has produced a paleontological sensitivity map of the County. The mapping indicates that areas underlain by playa lake, eolian and younger alluvial deposits within and around the Ford Dry Lake and Palen Dry Lake basins have a high paleontological sensitivity rating. Younger alluvium upslope from the lakebed has a low sensitivity rating, and older alluvium is assigned an undetermined sensitivity rating, according to the TLMA.

The results of these studies suggest that the Chuckwalla Valley is more paleontologically sensitive than originally believed (Roeder 2011, 2012a).

Paleontological Resources Identified within the DHSP

Given the results of recent surveys and construction monitoring in the Chuckwalla Valley and the Palo Verde Mesa, a complete paleontological field survey of the proposed DHSP was required. Between December 4, 2011 and January 2, 2012 Chambers Group conducted a paleontological field study of the proposed solar facility site, and gen-tie line Alternatives E. This work was conducted under BLM Field Authorization CA 12-01 and BLM Paleontological Investigation Permit No. CA-11-07-04P, and the results were presented in a report submitted to BLM (Roeder 2012a). A second paleontological field survey covering gen-tie line Alternatives B, C, and D was conducted in May of 2012 under BLM Field Authorization CA 12-05 (Roeder 2012b). The purpose of these field studies was to physically evaluate the geological mapping and to field check previously proposed paleontological sensitivity ratings. The field survey involved inspections of surface exposures for the presence of paleontological resources. During these surveys, exposures of Quaternary alluvium (Qal), Pleistocene nonmarine deposits (Qc), older Pleistocene nonmarine deposits (Qco), Quaternary sand (Qs), and Quaternary lake sediments (Ql) were observed at the surface and in shallow stream drainages. Most of the DHSP area was underlain by Quaternary alluvium on the surface of gently sloping alluvial fans. Most the material consisted of gravelly sands with some cobbles. These sediments became finer grain further away from the source area, the bases of the local mountains. Eight fossil localities were identified within the proposed project and alternative sites. One fossil locality, a mineralized tortoise shell fragment, was found in Quaternary alluvium in the easternmost parcel of the solar facility. Another fossil locality, a possible pelvis fragment from a large mammal, was found

along gen-tie line Alternative B/C. Five other fossil localities were clustered in dune sands on the edge of possible Quaternary lake sediments along gen-tie line Alternative E. The species identified here include: tortoise, rodent, rabbit, and bird.

As noted above, paleontological field assessments of those portions of the gen-tie alternatives which fall on Metropolitan Water District of Southern California (MWDSC) land have not been conducted.

Table 3.7-1. Paleontological Resources Identified within the DHSP

Project Component	Geologic Unit	Field Number	Taxa Description
Eastern Portion of Solar Facility (all alternative configurations)	Quaternary alluvium	MAR2011-12-04-01	*Gopherus* (tortoise)
Alternative B/C	Quaternary alluvium	STM05272012-01	Possible large mammal pelvis
Alternative E	Quaternary lake sediments?	MAR2011-12-11-01	*Gopherus* (tortoise)
Alternative E	Quaternary lake sediments?	MAR2011-12-11-02	*Rodentia* (rodent)
Alternative E	Quaternary lake sediments?	MAR2011-12-11-03	*Aves* (bird), *Rodentia* (rodent)
Alternative E	Quaternary lake sediments?	STM2011-12-11-01	*Gopherus* (tortoise)
Alternative E	Quaternary lake sediments?	STM2011-12-11-02	*Leporidae* (rabbit)
Alternative E	Quaternary lake sediments?	STM2011-01-02-01	Rodentia (rodent)

The literature search, record search, and field studies were used to identify the geologic units present in the DHSP area and to classify them according to the Potential Fossil Yield Classification (PFYC) system.

Geologic Units

Previous research indicates that the predominant geologic units in the DHSP area are Quaternary Sands (QS), Quaternary Alluvium (Qal), Quaternary lake or playa sediments (Ql), Pleistocene nonmarine deposits (Qc), Older Pleistocene nonmarine deposits (Qco), and Quaternary-Tertiary playa deposits (QT) (Table 3.7.2; see Figure 3.7.1 in Appendix A).

Table 3.7-2. Surficial and Bedrock Units Present within the Project Area

	Acres per Geologic Unit					
Project Component	**Qal**	**Qs**	**Ql***	**Qc**	**Qco**	**QT***
Solar Facility East	1052				X	X
Solar Facility West	155					
Alternative B/C	411			23	18	
Alternative D	354			37		X
Alternative E	371	82	X	7		X

*Possibly present at depth.
X = Possible presence.

Quaternary Sand (QS)

Although not formally mapped, Quaternary sand deposits are present in the proposed project vicinity, represented as small dunes. These deposits represent aeolian (dune sand) and are in

active phases of the dune cycle. These dunes move slowly with the rate depending on the direction and wind speed of the prevailing winds. Elsewhere, older sand dune deposits have yielded Late Pleistocene vertebrate fossils. Also, pond deposits associated with sand dunes have yielded significant fossils. Many areas of the Mojave and Colorado deserts, Aeolian (wind) forces have deflated older Quaternary alluvium sediments underlying dune fields which have yielded late Pleistocene vertebrates. A portion of the gen-tie line Alternative E route is covered by sand dunes.

Quaternary Alluvium (Qal)

Most of the proposed project area is underlain by Quaternary alluvium. Much of the ground surface of the western Chuckwalla Valley is covered by recent sediments, including alluvial sands, gravels, and cobbles in modern washes and on alluvial fans. The thickness of this Quaternary valley fill is highly variable. All of this alluvium has been and still is being washed down from the adjacent mountains and stratified by water, with the coarsest material near the mountain bases and finer grained and well stratified silts and clays further out in the basin. Broad alluvial fans are composed of unconsolidated deposits in a heterogeneous body of sediment, consisting of boulders, gravel, sands, and fine silts and clays. In general, these surficial deposits are likely Holocene (less than 10,000 years) in age in areas such as active stream drainages and on the fan surfaces. However, Quaternary alluvium is more complex structurally and age-wise than the geologic mapping indicates. Geologic mapping of eastern Chuckwalla Valley indicates that no fewer than five Pleistocene-Holocene alluvial units span the middle Pleistocene to Holocene. Because of this, the widespread temporal correlation of major alluvial episodes is difficult. The underlying factor controlling Quaternary deposition is probably contemporaneous climatic change over large regions. Recovery of datable paleontologic remains from alluvial fan sequences would thus have significance in understanding the Quaternary structural and paleoenvironmental record.

Quaternary alluvium has been noted over much of the proposed solar farm site and parts of gen-tie line Alternatives B, C, and E. During field survey of the easternmost solar facility parcel, one fossil locality [*Gopherus* (tortoise)] was identified within this geological unit (Roeder 2012a). A second fossil locality within this geological unit, a possible pelvis of a large mammal, was identified along gen-tie line Alternative B/C. In addition, paleosols which may contain small mammal fossils, were noted along gen-tie line Alternatives B/C and D near the SCE Red Bluff substation (Roeder 2012b). These paleosols are similar to those found at the RMSEGF. Finally, nearby LACM fossil localities were also located in Quaternary alluvium. These older Quaternary deposits yielded fossil specimens of tortoise (*Gopherus)*, horse (*Equus)*, and camel (*Camelops* and *Tanupolama stevensi).*The approximate ages of these fossils are unknown.

Quaternary lake or playa sediments (Ql)

Quaternary lake or playa sediments are usually fine grained and consist of partly gypsiferous silt and clay, and in southern California have yielded significant fossils. Frequently Quaternary alluvium and dune sand overlay these lacustrine deposits. Recent geological maps place Quaternary lake or playa deposits 1,000 feet east of the Alternative E gen-tie alignment; the identification of multiple fossil localities during paleontological field survey for the proposed project suggest that these deposits may be present at the surface in a portion of gen-tie line Alternative E. The species identified here include: tortoise, rodent, rabbit, and bird. However, the ages of these fossils are unknown. These Quaternary sediments were probably deposited as a result of an

expanded ancient Palen Lake (now Palen Dry Lake) and may interfinger at depth with Quaternary alluvium. If these lake or playa sediments are present within the DHSP area, they have the potential to yield significant fossils.

Pleistocene nonmarine deposits (Qc)

Sedimentary rocks of unnamed Pleistocene nonmarine sediments sticking up through Quaternary alluvium at the southern terminus of all of the gen-tie alternatives (A-E) near the Red Bluff Substation. Although there are no reliable age estimates for these deposits, they may be in excess of 100,000 years in age. Because of their proximity to the northern edge of the Chuckwalla Mountains, these sediments probably consist of coarse fanglomerates (sandstone supported pebbles, gravel, cobbles and boulders). Paleosols, which have the potential to yield significant small vertebrate fossils, were identified in this unit along Alternative D. Any diagnostic fossils from this rock unit would be considered significant.

Older Pleistocene nonmarine deposits (Qc_o)

Although not noted during the adjacent Desert Sunlight Solar Farm paleontological field survey (Aron and Kelly 2011), sedimentary rocks of older Pleistocene non-marine sediments are sticking up through Quaternary alluvium at the southern terminus of gen-tie line Alternatives B and C. There are no reliable age estimates for these deposits, but they may be 1 to 2 million years in age. Because of their proximity to the northern edge of the Chuckwalla Mountains, these sediments probably consist of coarse fanglomerates (sandstone supported pebbles, gravel, cobbles and boulders). Recent investigations of these deposits that crop out east of SR 177 and west of the western Chuckwalla Valley Road and on the south side of Chuckwalla Valley have found red paleosols (clays) visible below the desert pavement in washes and gullies. This find suggests that there is a potential for paleosols in older Pleistocene nonmarine deposits across the Chuckwalla Valley. Any diagnostic fossils from this rock unit would be considered significant.

Quaternary-Tertiary playa deposits (QT)

This unit has been interpreted as an abandoned Colorado River channel. These deposits are indicated by polished cobbles and cross-bedded sand in surface outcrops. Previous researchers have noted these deposits at elevations between 400 and 600 feet in the Palen Mountains, between the McCoy and Mule Mountains, and from the tip of the Big Maria Mountains to an area near the current Blythe airport. These regional finds suggest the possibility that these sediments may be present at elevations below 600 feet within the easternmost solar facility parcel, and in portions of the gen-tie line Alternative E alignment. Any diagnostic fossils from possible Quaternary-Tertiary deposits would be considered significant.

Potential Fossil Yield Classification

Class 1 – Very Low

Geologic units rated with a very low yield potential are primarily those that are not likely to contain fossil remains, such as igneous rocks (cooled magma), and metamorphic rocks (rocks changed by heat and pressure), as well as sedimentary rocks that are older than 542 million years (Precambrian in age). No rock units assigned to Class 1 occur within the DHSP area.

Class 2 – Low

Geologic units with low yield potential are those that are not likely to contain vertebrate fossil or scientifically significant non-vertebrate fossils. These units tend to be those that are younger than 10,000 years and sediments that have undergone significant physical and chemical changes. No rock units assigned to Class 2 occur within the DHSP area.

Class 3 – Moderate or Unknown

Geologic units with moderate or unknown yield potential are sedimentary deposits in which fossil discoveries vary in significance, abundance, and predictable occurrence (moderate), or sedimentary units of unproven or unknown fossil potential. No rock units assigned to Class 3 occur within the DHSP area.

Class 4 – High

Geologic units with high yield potential are those that contain a high occurrence of significant fossils that have been documented, but which may vary in occurrence and predictability. Quaternary sand (Qs), Quaternary alluvium (Qal), Quaternary lake deposits (Ql), Pleistocene nonmarine deposits (Qc), older Pleistocene nonmarine deposits (Qco) and Quaternary-Tertiary *playa* sediments (QT) are assigned a PFYC of Class 4.

Class 5 – Very High

Geologic units with very high yield potential are those that consistently and predictably produce vertebrate or scientifically significant non-vertebrate fossils. No rock units assigned to Class 5 occur within the DHSP area.

Summary

Geologic strata with a high potential rating according to the PFYC system underlie the proposed solar facility and portions of all of the gen-tie alternatives.

3.8 FIRE AND FUELS MANAGEMENT

This section describes the environmental and regulatory settings associated with the construction and operation of the proposed project and alternatives with respect to fire and fuels management. The project study area for the fire and fuels management impact analysis includes the portion of the Chuckwalla Valley within a mile of the proposed project site and alternatives, as this is the limit of the area likely to be affected by the Desert Harvest Solar Project (DHSP) with respect to fire and fuels management.

3.8.1 Applicable Regulations, Plans, and Standards

Federal

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) requires utilities to adopt and maintain minimum clearance standards between vegetation and transmission voltage power lines. These clearances vary depending on voltage. In most cases, however, the minimum clearances required in state regulations are greater than the federal requirement. In California, the state has adopted General Order 95 rather than the North American Electric Reliability Corporation (NERC) Standards as the electric safety standard for the State. Since the state regulations meet or exceed the FERC standards, the FERC requirements are not discussed further in this section, as compliance with the state requirements will ensure that the federal requirements are met.

Federal Wildland Fire Management Policy

The Federal Wildland Fire Management Policy was developed in 1995 and updated in 2001 by the National Wildfire Coordinating Group, a federal multi-agency group that establishes consistent and coordinated fire management policy across multiple federal jurisdictions. Guidance for implementing the policy was issued in 2008. An important component of the Federal Wildland Fire Management Policy is the acknowledgement of the essential role of fire in maintaining natural ecosystems. The Federal Wildland Fire Management Policy and its implementation guidance are founded on the following guiding principles:

- Firefighter and public safety is the first priority in every fire management activity.
- The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.
- Fire management plans, programs, and activities support land and resource management plans and their implementation.
- Sound risk management is a foundation for all fire management activities.
- Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.
- Fire management plans and activities are based upon the best available science.
- Fire management plans and activities incorporate public health and environmental quality considerations.

- Federal, State, tribal, local, interagency, and international coordination and cooperation are essential.
- Standardization of policies and procedures among federal agencies is an ongoing objective.

International Fire Code

Created by the International Code Council, the International Fire Code addresses a wide array of conditions hazardous to life and property including fire, explosions, and hazardous materials handling or usage. The International Fire Code places an emphasis on prescriptive and performance-based approaches to fire prevention and fire protection systems. Updated every 3 years, the International Fire Code uses a hazards classification system to determine the appropriate measures to be incorporated in order to protect life and property (often times these measures include construction standards and specialized equipment). The International Fire Code uses a permit system (based on hazard classification) to ensure that required measures are instituted.

National Electric Safety Code 1977, 2006

The National Electric Safety Code covers basic provisions related to electric supply stations, overhead electric supply and communication lines, and underground electric supply and communication lines. The code also contains work rules for construction, maintenance, and operational activities associated with electric supply and communication lines and equipment. The code, which must be adopted by states on an individual basis, is not applicable in the State of California. As stated previously, the State of California has adopted its own standard (General Order 95) rather than a general national standard. The National Electric Safety Code is not discussed further.

North American Electric Reliability Corporation Standards

The NERC is a nonprofit corporation comprising 10 regional reliability councils. The overarching goal of NERC is to ensure the reliability of the bulk power system in North America. To achieve its goal, the NERC develops and enforces reliability standards, monitors the bulk power systems, and educates, trains, and certifies industry personnel (NERC 2011). In order to improve the reliability of regional electric transmission systems and in response to the massive widespread power outage that occurred on the Eastern Seaboard, NERC developed a transmission vegetation management program that is applicable to all transmission lines operated at 200 kV and above to lower voltage lines designated by the Regional Reliability Organization as critical to the reliability of the electric system in the region. The plan, which became effective on April 7, 2006, establishes requirements for the formal transmission vegetation management program, which include identifying and documenting clearances between vegetation and any overhead, ungrounded supply conductors, while taking into consideration transmission line voltage, the effects of ambient temperature on conductor sag under maximum design loading, fire risk, line terrain and elevation, and the effects of wind velocities on conductor sway (NERC 2006). The clearances identified must be no less than those set forth in the Institute of Electrical and Electronics Engineers Standard 516-2003 (*Guide for Maintenance Methods on Energized Power Lines*) (NERC 2006).

Institute of Electrical and Electronics Engineers Standard 516-2003

The Institute of Electrical and Electronics Engineers is a leading authority in setting standards for the electric power industry. Standard 516-2003, *Guide for Maintenance Methods on Energized*

Power Lines, establishes minimum vegetation-to-conductor clearances in order to maintain electrical integrity of the electrical system.

State of California

California Fire Code

The California Fire Code is contained within Chapter 9 of Title 24 of the California Code of Regulations (CCR). Based on the International Fire Code, the California Fire Code is created by the California Buildings Standards Commission and regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. Similar to the International Fire Code, the California Fire Code and the California Building Code use a hazards classification system to determine the appropriate measures to incorporate to protect life and property.

California Health and Safety Code

State fire regulations are established in Section 13000 of the California Health and Safety Code. The section establishes building standards, fire protection device equipment standards, high-rise building and childcare facility standards, interagency support protocols, and emergency procedures. Also, Section 13027 states that the state fire marshal shall notify industrial establishments and property owners having equipment for fire protective purposes of the changes necessary to bring their equipment into conformity with, and shall render them such assistance as may be available in converting their equipment to, standard requirements.

California Fire Plan

The California Fire Plan is the statewide plan for reducing the risk of wildfire. The basic principles of the Fire Plan are as follows:

- Involve the community in the fire management planning process
- Assess public and private resources that could be damaged by wildfires
- Develop pre-fire management solutions and implement cooperative programs to reduce community's potential wildfire losses.

One of the more important objectives of the plan regards pre-fire management solutions. Included within the realm of pre-fire management solutions are fuel breaks, the establishment of Wildfire Protection Zones, and prescribed fires to reduce the availability of fire fuels. In addition, the Fire Plan recommends that clearance laws, zoning, and related fire safety requirements implemented by state and local authorities address fire-resistant construction standards, hazard reduction near structures, and infrastructure (California Board of Forestry 2010).

CPUC General Order 95: Rules for Overhead Electric Line Construction

General Order (GO) 95 is the key standard governing the design, construction, operation, and maintenance of overhead electric lines in the State. It was adopted in 1941 and updated most recently in 2006. GO 95 includes safety standards for overhead electric lines, including minimum distances for conductor spacing, minimum conductor ground clearance, standards for calculating maximum sag, electric line inspection requirements, and vegetation clearance requirements.

Rule 31.2, Inspection of Lines, requires that lines be inspected frequently and thoroughly for the purpose of ensuring that they are in good condition, and that lines temporarily out of service be inspected and maintained in such condition as not to create a hazard.

Public Resources Code 4291

Public Resources Code 4291 provides that a person who owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining a mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or land that is covered with flammable material, shall at all times maintain defensible space of 100 feet from each side and from the front and rear of the structure, but not beyond the property line.

Riverside County

Riverside County General Plan

The Safety Element of the Riverside County General Plan provides for the mitigation of fire-related hazards through a combination of transportation, construction, land use, education, coordination and development standards. The Safety Element addresses the fire-related hazards present within the county, aiming to mitigate wildfire hazards, eliminate earthquake-induced fire hazards, and the reduction of long-term safety hazards related to wildfire effects, including erosion and debris flow. Riverside County has prepared graphics that identify fire-related hazards; the proposed project site and gen-tie line alternatives do not intersect any high-risk hazards (Riverside County 2003). Within the Riverside County General Plan, the Desert Center Area Plan identifies areas of steep slope as the riskiest areas for fire-related hazards. The proposed project and alternatives would occur on flat to gently sloping ground. The Plan calls for avoidance of building in high-risk areas, creating setbacks that buffer development from hazard areas, maintaining brush clearance to reduce potential fuel, installing low-fuel landscaping, utilizing fire resistant building techniques, and public education to reduce fire-related risk.

Riverside County General Plan policies relating to fire prevention are as follows:

S 5.1 Develop and enforce construction and design standards that ensure that proposed development incorporates fire prevention features through the following:

a. All proposed construction shall meet minimum standards for fire safety as defined in the County Building or Fire Codes, or by County zoning, or as dictated by the Building Official or the Transportation Land Management Agency based on building type, design, occupancy, and use.

b. In addition to the standards and guidelines of the Uniform Building Code and Uniform Fire Code fire safety provisions, continue additional standards for high-risk, high occupancy, dependent, and essential facilities where appropriate under the Riverside County Fire Protection Ordinance. These shall include assurance that structural and nonstructural architectural elements of the building will not:

- impede emergency egress for fire safety staffing/personnel, equipment, and apparatus; nor
- hinder evacuation from fire, including potential blockage of stairways or fire doors.

c. Proposed development in Hazardous Fire areas shall provide secondary public access, unless determined otherwise by the County Fire Chief.

d. Proposed development in Hazardous Fire areas shall use single loaded roads to enhance fuel modification areas, unless otherwise determined by the County Fire Chief.

Riverside County General Plan policies relating to wind- and earthquake-related "worst-case scenario" fires are as follows:

S 5.2 Reduce fire threat and strengthen fire-fighting capability so that the County could successfully respond to multiple fires.

S 5.3 Require automatic natural gas shutoff earthquake sensors in high-occupancy industrial and commercial facilities, and encourage them for all residences.

S 5.4 Utilize ongoing brush clearance fire inspections to educate homeowners on fire prevention tips.

Riverside County General Plan policies relating to long-term fire safety are as follows:

S 5.5 Conduct and implement long-range fire safety planning, including stringent building, fire, subdivision, and municipal code standards, improved infrastructure, and improved mutual aid agreements with the private and public sector.

S 5.6 Ensure coordination between the Fire Department and the Transportation Land Management Agency, Environmental Health Department and private and public water purveyors to improve firefighting infrastructure, during implementation of the County's capital improvement programs, by obtaining:

- replacement and/or relocation of old cast-iron pipelines and inadequate water mains when street improvements are planned;
- assessment of impact fees as a condition of development; and
- redundant emergency distribution pipelines in areas of potential ground failure or where determined to be necessary.

S 5.7 Develop a program to utilize existing reservoirs, tanks, and water wells in the County for emergency fire suppression water sources.

S 5.8 Periodically review inter-jurisdictional fire response agreements, and improve firefighting resources as recommended in the County Fire Protection Master Plan to keep pace with development, including construction of additional high-rises, mid-rise business parks, increasing numbers of facilities housing immobile populations, and the risk posed by multiple ignitions, to ensure that:

- Fire reporting and response times do not exceed those listed in the County Fire Protection Master Plan identified for each of the development densities described;
- Fire flow requirements (water for fire protection) are consistent with Insurance Service Office (ISO) recommendations; and

- The planned deployment and height of aerial ladders and other specialized equipment and apparatus are sufficient for the intensity of development desired.

S 5.9 Continue County Fire Department collaboration with the Transportation Land Management Agency (TLMA) to update development guidelines for the urban/wildland interface areas. These guidelines should include increasing the development area to at least 30 feet past the usual boundary.

S 5.10 Continue to utilize the Riverside County Fire Protection Master Plan as the base document to implement the goals and objectives of the Safety Element.

Riverside County Specific Plan #47

"In the interest of Public Safety, the project shall provide an Alternate or Secondary Access(s) as stated in the Transportation Department Conditions. Said Alternate or Secondary Access(s) shall have concurrence and approval of both the Transportation and Fire Departments and shall be maintained throughout any phasing."

Uniform Building Code (UBC) and Uniform Fire Code (UFC)

Every three years, the County's Building and Fire Codes are adapted from the Uniform Building and Fire Codes. They contain baseline minimum standards to guard against unsafe development and to ensure fire apparatus access to developments.

3.8.2 Existing Conditions

As described above, the study area for wildfires is defined as the area within 1 mile of the proposed project and alternatives. Based on the type of vegetation and topography in the area, this study area represents a reasonable maximum extent of a wildfire ignited from the project in native vegetation, which primarily surrounds the solar facility site under existing conditions. Sensitive receptors nearby the site include isolated rural residences at 1.24 miles or more from the site, and residences in the communities of Lake Tamarisk and Desert Center, located between 1 and 5 miles south of the solar facility site and within several hundred feet of the gen-tie line alternatives.

The behavior and characteristics of wildfires depend on a number of biophysical and anthropogenic (human-caused) factors. The biophysical variables are fuels (including composition, cover, and moisture content), weather conditions (particularly wind velocity and humidity), topography (slope and aspect), and natural ignition sources (particularly lightning). The anthropogenic variables are ignitions sources (including arson, smoking, campfires, and power lines) and management (wildfire prevention and suppression efforts). Existing anthropogenic ignition sources in the project study area include scattered rural residences, farm equipment, vehicles traveling on Kaiser Road and other roads in the project study area, and ongoing construction of the Desert Sunlight Solar Farm project directly north of the proposed DHSP solar facility site. Construction vehicles and equipment are listed in Section 2.5.5 and operational equipment is addressed in Section 2.5.6.

Vegetation with low moisture content is more susceptible to ignitions and burns more readily than vegetation with higher moisture content. Grasses tend to ignite more easily and burn faster, but tend to burn for a shorter duration than woody vegetation such as shrubs and trees. Conti-

nuity of fuels helps sustain wildland fires. Dense vegetation tends to carry a fire farther than patchy vegetation. The presence of invasive annual grasses, however, can provide fuel connectivity in patchy desert shrublands that would otherwise provide inconsistent fuel for a wildland fire. High winds provide oxygen to wildfires and can also blow glowing embers off burning vegetation to areas far ahead of the front of a fire, allowing fires to jump fuelbreaks in some cases. Conditions of low relative humidity will dry out fuels, increasing the likelihood of ignition. Finally, steep slopes and slopes with exposure to wind will carry fires rapidly uphill, and fires that are extinguished in mountainous areas are often contained along ridgelines.

The proposed project and alternatives would be in open desert, characterized by sparse vegetation and minimal development. Topography in the project study area is nearly level to gently sloping. The project study area in Riverside County has been determined to have a low to moderate susceptibility to wildfire (Riverside County 2003). There is no record of any fire greater than 10 acres having occurred within 1 mile of the project study area. A few large fires have been recorded over 10 miles away in JTNP (CAL FIRE 2010).

Fire Hazard Severity Zones (FHSZ) are areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors that have been mapped by the California Department of Forestry and Fire Protection (CAL FIRE) in accordance with Public Resources Code (PRC) 4201-4204 and Government Code 51175-89. FHSZs are ranked from moderate to very high and are categorized for fire protection as within a Federal Responsibility Area (FRA) under the jurisdiction of a federal agency, within a State Responsibility Area (SRA) under the jurisdiction of CAL FIRE, or within a Local Responsibility Area (LRA) under the jurisdiction of a local agency. The project study area is primarily within a FRA under the jurisdiction of the BLM, and the solar facility site is within a moderate FHSZ (CAL FIRE 2006). BLM is responsible for the suppression, fuels, and prevention/mitigation/education in this area. Some of the gen-tie line routes are located within a SRA. All construction and operational activities would occur within a moderate FHSZ. The nearest high FRSZ is east of JTNP, about 35 miles from the DHSP site.

The BLM Palm Springs–South Coast Field Office operates 2 firefighting facilities. These stations are BLM Pinyon station collocated with Riverside County Station 30 in the Santa Rosa and San Jacinto Mountains National Monument (over 60 miles west of the project study area), and the Black Rock Interagency Fire Center in JTNP (60 miles west of the project study area). The South Coast Fuels technician and specialists are stationed at the Palm Springs Field Office in Riverside County. The Palm Springs–South Coast Field Office works cooperatively with many other federal, state and county agencies and fire departments. The CAL FIRE station in Desert Center is the closest response resource to the project study area. Under the California Fire Master Agreement the closest resource would be requested to respond until the responsible agency arrives to assume command.

All fire stations serving SRAs and LRAs in Riverside County are dispatched by the CAL FIRE Riverside Unit/Riverside County Fire Department Emergency Command Center (Perris Dispatch Center) and are part of the "Integrated Fire Protection System," under contract with the State. The BLM would be notified and a response from BLM would be dispatched if the event occurred on FRA lands. The Federal Interagency Communications Center, San Bernardino Dispatch, would be notified. Closest to the project study area are the Lake Tamarisk Fire Station in Desert Center (with one County paramedic assessment engine; 6 miles south of the solar facility site); Blythe Air Base in Blythe (with one County paramedic assessment engine; 50 miles east of the

project); Riverbend Volunteer Fire Department in Blythe (50 miles east of the project); La Quinta South Fire Station in La Quinta (with one City paramedic assessment engine and one County brush engine; 60 miles west of the project); Coachella Fire Station (with one City paramedic assessment engine; 55 miles west of the project); Sun City Shadow Hills Station in Indio (with one City paramedic assessment engine55 miles west of the project); and Indio, North Indio, and West Indio Fire Stations in Indio (55 miles west of the project; Riverside County Fire Department 2011).

In summary, fire risk in the project study area is moderate, and the potential for a major fire to occur in the area surrounding the proposed project is moderate.

3.9 SOILS AND GEOLOGY

This section describes the existing soil resources and geology in the area where the proposed Project and Alternatives would be implemented. The project study area for soils and geology encompasses all soil resources that could be affected by, and geological hazards that could affect, the construction, operation, and decommissioning of the Desert Harvest Solar Project (DHSP).

3.9.1 Applicable Plans, Policies, and Regulations

Federal

Federal Land Policy and Management Act of 1976 as Amended

The Federal Land Policy and Management Act (FLPMA) establishes policy and goals to be followed in the administration of public lands by the BLM. The intent of FLPMA is to protect and administer public lands within the framework of a program of multi-use and sustained yield, and the maintenance of environmental quality. Particular emphasis is placed on the protection of the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resources and archaeological values. FLPMA is also concerned with the protection of life and safety from natural hazards. The DHSP fits within the multi-use framework created by the FLPMA.

California Desert Conservation Area Plan

The California Desert Conservation Area (CDCA) Plan defines multiple use classes for BLM-managed lands in the CDCA, which includes land encompassing the DHSP. With respect to geological resources, the CDCA Plan aims to maintain the availability of mineral resources on public lands for exploration and development.

State of California

California Building Code

The 2006 International Building Code (IBC) is a model building code developed by the International Code Council (ICC) that sets rules specifying the minimum acceptable level of safety for constructed objects such as buildings in the United States. The IBC was developed to consolidate existing building codes into one uniform code that provides minimum standards to ensure the public safety, health and welfare insofar as they are affected by building construction, and to secure safety of life and property from all hazards incident to the occupancy of buildings, structures and premises. As a model building code, the IBC has no legal status until it is adopted or adapted by government regulation. With some exceptions, the California Building Code (CBC) is based on the IBC.

The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC 2007 Edition is based on the 2006 IBC as published by the ICC, with the addition of more extensive structural seismic provisions. Chapter 16 of the CBC contains definitions of seismic sources and the procedure used to calculate seismic forces on structures. The Applicant would construct the DHSP in accordance with the CBC and IBC requirements.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 regulates development and construction of buildings intended for human occupancy to avoid the hazards resulting from surface fault rupture. While this act does not specifically regulate solar fields and transmission lines, it does help define areas where fault rupture is most likely to occur. According to the Act, active faults are those that have experienced surface or near surface rupture in the past 11,000 years. Classification under the Act includes the condition that a fault must be "sufficiently active" and "well defined" by detailed site-specific geologic explorations in order to determine whether building setbacks should be established. No components of the proposed project or alternatives are within an Alquist-Priolo Earthquake Fault Zone. The nearest active faults to the DHSP site are the Blue Cut fault system (10 miles north, northwest) and the Pinto Mountain fault zone (29 miles northwest).

Seismic-Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 directs the California Geological Survey to delineate seismic hazard zones. The purpose of this act is to reduce the threat to public health and safety, and to minimize the loss of life and property by identifying and mitigating seismic hazards. These seismic hazards include areas that are subject to the effects of strong ground shaking such as liquefaction, landslides, tsunamis and seiches.[1] Cities, counties, and state agencies are directed to use seismic hazard zone maps developed by the California Geological Survey in their land use planning and permitting processes. This act requires that site-specific geotechnical investigations be performed prior to permitting most urban development projects within seismic hazard zones. The DHSP lies outside any designated seismic hazard zones.

Riverside County

Riverside County General Plan

The Safety Element of the Riverside County General Plan provides for the mitigation of geologic hazards through a combination of engineering, construction, land use and development standards. The Safety Element addresses the geologic hazards present within the county, including fault rupture, ground shaking, liquefaction, seismically generated subsidence, seiche and dam inundation, landslides/mudslides, non-seismic subsidence, and erosion. Riverside County has prepared graphics that identify geologic hazards, including fault rupture, liquefaction hazards and landslide hazards, and the project would not occur in any high-risk hazard areas (Riverside County 2003). Special consideration, including possible engineering/geologic evaluation, is required for developing sites designated on these maps. The Desert Center Area Plan, part of the General Plan, also provides an overview of mitigations for geologic hazards in the Desert Center area. The DHSP would comply with the relevant components of the Safety Element.

Riverside County General Plan policies relating to fault rupture, seismicity, and seismic risk are as follows:

[1] A seiche is a sudden oscillation of a body of water (e.g., lake or bay) producing fluctuations in the water level and caused by wind earthquakes, or changes in barometric pressure.

S 2.1 Minimize fault rupture hazards through enforcement of Alquist-Priolo Earthquake Fault Zoning Act provisions and the following policy, among others: Require geologic studies or analyses for critical structures, and lifeline, high occupancy, schools, and high-risk structures within 0.5 miles of all Quaternary to historic faults shown on the Earthquake Fault Studies Zone map.

Riverside County General Plan policies related to liquefaction are as follows:

S 2.2 Require geological and geotechnical investigations in areas with potential for earthquake-induced liquefaction, landsliding or settlement as part of the environmental and development review process, for any structure proposed for human occupancy, and any structure whose damage would cause harm.

S 2.3 Require that a State-licensed professional investigate the potential for liquefaction in areas designated as underlain by "Susceptible Sediments" and "Shallow Groundwater" for all general construction projects.

S 2.7 Require a 100 percent maximum variation of fill depths beneath structures to mitigate the potential of seismically-induced differential settlement.

Riverside County General Plan policies related to ground subsidence are as follows:

S 3.8 Require geotechnical studies within documented subsidence zones as well as zones that may be susceptible to subsidence prior to the issuance of development permits.

S 3.10 Encourage and support efforts for long-term, permanent monitoring of topographic subsidence in all producing groundwater basins, irrespective of past subsidence.

Riverside County General Plan policies related to slope stability are as follows:

S 3.5 During permit review, identify and encourage mitigation of onsite and offsite slope instability, debris flows, and erosion hazards on lots undergoing substantial improvements.

S 3.6 Require grading plans, environmental assessments, engineering and geologic technical reports, irrigation, and landscaping plans, including ecological restoration and revegetation plans, as appropriate, in order to assure the adequate demonstration of a project's ability to mitigate the potential impacts of slope and erosion hazards and loss of native vegetation.

3.9.2 Existing Conditions

Topography

The solar facility site is located in a largely undeveloped, vacant, and fairly flat area in the Chuckwalla Valley of the Sonoran Desert in eastern Riverside County. The Desert Center region is surrounded by the Eagle, Coxcomb, and Chuckwalla Mountains. Sand dunes with native desert habitats compose most of the Desert Center planning area (Riverside County General Plan, Desert Center Area Plan 2003). However, the solar facility site contains no active sand dunes and overlaps only a small portion of the Desert Center planning area. Only a portion of gen-tie Alternative E would traverse sand dunes. The solar facility site is underlain by alluvial sediments. (BLM 2011)

Geology

Regional Geology

The solar facility site lies within the Mojave Desert geomorphic province (BLM 2011), which is located in the westernmost part of the Basin and Range geomorphic province. The Mojave Desert geomorphic province is a broad interior region of isolated mountain ranges separated by expanses of desert plains. It as an interior enclosed drainage, with playas (or dry lake basins) being common. Fault trends largely control Mojave Desert topography. Mountain ranges in the Mojave Desert geomorphic province are composed of complexly faulted and folded basement rocks that range in age from pre-Cambrian (more than 570 million years before present (mybp) to Mesozoic (66 to 240 mybp). Volcanic and sedimentary rocks deposited in the Cenozoic (less than 66 mybp to present) are common as well. Younger faulting in the eastern half of the Mojave Desert geomorphic province, where the DHSP is located, is characterized by generally north- to northwest-trending normal faults associated with regional extension in the Basin and Range province.

The DHSP project components lie within the Chuckwalla Valley, which is bounded on the west by the Eagle Mountains, on the east by the Palen Mountains, and to the north by the Coxcomb Mountains. The Chuckwalla Mountains are to the south. The Chuckwalla Valley contains a thick sequence of Quaternary sedimentary deposits including Pleistocene fan deposits, Holocene alluvium, and dune sand. The bordering mountains expose primarily Precambrian metamorphic and Mesozoic granitic rocks. The Blue Cut and Pinto Mountain Fault Zones, north-northwest and 11 and 29 miles, respectively, from the solar facility site, are the nearest active faults. The San Andreas Fault is approximately 38 miles southwest of the solar facility site (USGS 2011).

Local Geology

The predominant geologic unit in the DHSP area is Quaternary alluvium and marine deposits (USGS 2005). No active faults are mapped in the current footprint of the DHSP or within the Chuckwalla Valley area more generally. The Blue Cut Fault Zone is the closest active fault zone; it is approximately 11 miles north of the solar facility site (USGS 2011).

Geologic Hazards

Geologic hazards that may affect the region include seismic hazards (ground shaking, surface fault rupture, soil liquefaction, and other secondary earthquake-related hazards), slope instability, ground subsidence, and erosion.

Primary Seismic Hazards

Seismic Sources. Numerous active faults or seismic zones lie within 62 miles (100 kilometers) of the solar facility site (Table 3.9-1). The primary seismic hazard to the site is strong ground shaking from earthquakes along the Pinto Mountain Fault north of the solar facility site, the San Andreas Fault to the southwest, and the many faults within the Eastern California Shear Zone.

Table 3.9-1. Regional Active Earthquake Faults

Fault Section Name	Distance from Solar Facility Site (miles)	Distance from Solar Facility Site (km)	Trace Length (km)	Mean Magnitude	Mean Return Interval (years)	Slip Rate (mm/yr)
Blue Cut	11.0	17.7	79	7.1	—	—
Pinto Mountain	29.3	47.2	74	7.2	—	2.5
Brawley, western edge of seismic zone	36.8	59.2	60	7.0	—	—
San Andreas (Coachella)	36.8	59.2	69	7.2	69	20
Brawley, eastern edge of seismic zone	38.0	61.2	61	7.0	—	—
Pisgah–Bullion Mountain–Mesquite Lake	40.0	64.4	88	7.3	—	0.8

Source: Working Group on California Earthquake Probabilities, Special Report 203, Appendix A, BLM 2011

Surface Fault Rupture. The solar facility site is not within a currently delineated Alquist-Priolo Earthquake Fault Zone (Hart 1997). Well-delineated active fault lines cross through the region, as shown on California Geological Survey maps (BLM 2011); however, no active faults are mapped in the immediate vicinity of the DHSP. Therefore, active fault rupture is unlikely to occur in the project vicinity. While fault rupture would most likely occur along previously established fault traces, future fault rupture also could occur at other locations.

Historic Seismicity and Seismic Risk. Several earthquakes of magnitude 5.0 or greater have occurred within 70 miles of the project site since 1800 (BLM 2011). These include the 1948 Desert Hot Springs earthquake (Magnitude [M] 6.0), the 1949 Pinto Mountains earthquake (M5.0), and the 1992 Joshua Tree earthquake (M6.1) that was an aftershock of the Landers earthquake. All three earthquakes occurred within the San Andreas Fault system, which is the closest active fault system to the solar facility site.

The primary seismic risk at the solar facility site is a potential earthquake along the San Andreas Fault. This fault is 37 miles southwest from the site (Working Group on California Earthquake Probabilities 2008). Geologists at the USGS believe that the San Andreas Fault has characteristic earthquakes that result from rupture of each fault segment. The estimated characteristic earthquake is M 7.7 for the southern segment and 7.2 for the Coachella segment (USGS 2008). This segment has the longest elapsed time since rupture of any part of the San Andreas Fault. The last rupture occurred about 1680, based on dating by the USGS near Indio (Working Group on California Earthquake Probabilities 2008). This segment also ruptured on or around 1020, 1300, and 1450, with an average recurrence interval of about 220 years. The San Andreas Fault may rupture in multiple segments, producing a higher magnitude earthquake. Recent paleoseismic studies suggest that the San Bernardino Mountain Segment to the north and the Coachella Segment, both found within the southern segment of the San Andreas Fault system, may have ruptured together in 1450 and 1680 (Working Group on California Earthquake Probabilities 2008).

While accurate earthquake predictions are not possible, various agencies have conducted statistical risk analyses. In 2008, the California Geological Survey and the U.S. Geological Survey (USGS) completed probabilistic seismic hazard maps (BLM 2011). The recent report by the Working Group of California Earthquake Probabilities (2008) estimated a 58 percent conditional probability that an M6.7 or greater earthquake may occur between 2008 and 2038 along the southern segment of the San Andreas Fault (BLM 2011). The southern segment of the San Andreas Fault appears to originate near the Salton Sea and bends to the northwest, along the

southern base of the San Bernardino Mountains, through the Tejon Pass, and then along the northern base of the San Gabriel Mountains.

Site Acceleration. The potential intensity of ground motion may be estimated by the horizontal peak ground acceleration, measured in "g" forces (g is equivalent to the acceleration due to Earth's gravity, or 9.81 meters per second squared). Ground motions depend primarily on the earthquake magnitude and distance to the rupture zone. Accelerations also depend on attenuation by rock and soil deposits, direction of rupture, and type of fault. For these reasons, ground motions may vary considerably in the same general area. This variability can be expressed statistically by a standard deviation about a mean relationship. Important factors influencing the structural performance include the duration and frequency of strong ground motion, local subsurface conditions, soil-structure interaction, and structural details. Based on seismic hazard maps and soil data for the project study area, BLM (2011) measured the probable peak ground acceleration in the vicinity of the DHSP site. BLM estimated a peak ground acceleration of 0.24g, which corresponds with very strong perceived shaking and moderate potential damage. Peak ground acceleration calculations are used in determining CBC seismic design parameters.

Seismic Hazard Zones. This portion of Riverside County has not been mapped under the California Seismic Hazard Mapping Act (BLM 2011). Because the solar facility site is nearly flat, there is negligible potential for landslides (BLM 2011). The site lies in a moderate liquefaction potential zone designated by Riverside County (Riverside County 2003). See more regarding liquefaction under secondary seismic hazards below.

Secondary Seismic Hazards. Secondary seismic hazards related to ground shaking generally include soil liquefaction, ground subsidence, slope instability, tsunamis, and seiches.

- *Soil Liquefaction.* Liquefaction is the loss of soil strength from sudden shock (usually earthquake shaking), causing the soil to become a fluid mass. In general, for the effects of liquefaction to be manifested at the surface, groundwater levels must be within 50 feet of the ground surface and the soils within the saturated zone must also be susceptible to liquefaction. Water level data from a well located approximately 2 miles southwest of the proposed solar facility suggest static water levels in excess of 100 feet, with historic shallow water levels greater than 60 feet (BLM 2011). This may mean that liquefaction is unlikely on the solar facility site; however, as noted above, Riverside County has designated the area as having moderate liquefaction potential.
- *Ground Subsidence.* The solar facility site is within a Riverside County–designated "susceptible" subsidence zone (Riverside County 2003). Dry sands tend to settle and compact when subjected to strong earthquake shaking. The amount of subsidence is dependent on relative density of the soil, ground motion, and earthquake duration. Uncompacted fill areas of the site may be susceptible to seismically induced settlement.
- *Slope Instability.* Because the solar facility site has nearly flat topography, the potential for large-scale landslides is negligible. However, local surface failures and debris flows within and along incised drainage channels are likely if strong ground shaking occurs (BLM 2011).
- *Tsunamis and Seiches.* The solar facility site is far inland so there is no risk from tsunamis. There are no water storage reservoirs on or near the site, so the hazards from seiches are considered negligible in the project study area.

Other Geologic Hazards

Water Erosion

The site is nearly flat and undisturbed, with sparse native desert vegetation. Figure 3.20-2 in Appendix A shows surface waters in the project area, including 12 channels which traverse the DHSP site in a northwest-to-southeast direction. These channels are characterized by streams and washes which are typically sandy or rocky bed streams, where flow occurs in direct response to precipitation events, and is typically heavily laden with sediment. Erosion of the wash banks and shifting of channel beds is common. Larger magnitude storms tend to result in sheet flow in the project area, also moving in a northwest-to-southeast direction. There are no perennial streams within the solar facility site. The solar facility and gen-tie line would be sited in an area where sheet flooding and erosion could occur, with localized flooding that may overwhelm and shift ephemeral drainages during seasonal precipitation and flash flood events.

Wind Erosion

No active surface aeolian (wind-driven) sand deposits are present within the solar facility site; however, fluvial sand transport across the site likely carries sand downslope toward Pinto Wash, where fine sands may be taken up into the aeolian sand transport system toward the Palen Dunes. This aeolian sand corridor of the Clarks Pass system extends from Dale Dry Lake, through Pinto Basin in JTNP and Pinto Wash to just east of Ford Dry Lake, 20 miles southwest of the proposed solar facility site. As shown in Figure 3.3-1b, approximately 1.0 miles (18.9 acres) of Gen-tie line Alternative E would cross into the margins of the dune system located to the west of that alternative. Refer to Section 3.4 for a discussion of the sand corridor system with regard to habitat for protected species in the area.

Soil Resources

Soils and sediments are composed of minerals and organic materials in various ratios, derived from ambient conditions of the location within the landscape, vegetation type, rainfall, and the geologic source materials. The mineral portion of a soil consists of a ratio of sand, silt, and clay identified as soil texture. Soils contain naturally occurring background levels of metals derived from the factors influencing soil formation.

The soils on the solar facility site have not been surveyed by the Natural Resources Conservation Service (NRCS), a division of the United States Department of Agriculture that maps soil types across land in the United States, so specific soil types are not known for the solar facility site. However, analysis for the Desert Sunlight Solar Farm (DSSF) project just north of the DHSP site included a 2009 geotechnical study, incorporated by reference in Section 1.11 (BLM 2011). The geotechnical study of that site found that soils were generally uniform and were dominated by sandy texture. The similarities between the surface soil textures and vegetation cover at the DSSF project site and the DHSP site suggest that the subsurface soils characteristics are likely to be similar given the proximity of the two sites. Soils encountered during the DSSF geotechnical survey of the surrounding area consist of sand dune deposit, younger alluvium, and older alluvium. The older alluvium was slightly moist, likely due to winter rain infiltration and in a medium dense to dense condition, while the sand dune deposits were generally soft and dry (BLM 2011). Soils in the 2009 geotechnical study exhibited low to very severe resistivity and were classified as having a very low expansion potential (BLM 2011).

Soils south and east of the solar facility site were surveyed by the NRCS (BLM 2011). The survey area was associated with agricultural lands found next to Rice Road, within the gen-tie line Alternative D corridor and 1.5 miles east and 2.5 miles south of the solar facility site. The NRCS classified soils in this area as gravelly loamy coarse sands (Carsitas series) and loamy sands (Rositas series). According to the NRCS, Carsitas and Rositas soils typically do not have a topsoil horizon (BLM 2011). Soils are described as having C horizons from 0 to 60 inches below grade, indicating the absence of soil-forming. For both Carsitas and Rositas soils, water erosion hazard is minor and windblown erosion hazard is severe (BLM 2011).

The project study area, including the solar facility site, contains desert pavement (BLM 2011). Desert pavements are areas with rock fragments of pebble to cobble size that cover an underlying layer of sand, silt, or clay. Desert pavement areas typically have little or no vegetation cover. The extent to which desert pavement reduces wind erosion and resulting fugitive dust depends on the density of the rock fragments covering the underlying soil.

Desert pavements seem to form from two different processes (McAuliffe 2011). On rocky alluvial fans, fine dust settling out of the air accumulates between and below the surface layer of rocks, eventually forming a thin silt and clay layer that separates the surface rocks from the main part of the alluvial fan. Desert pavement also can form on sandy soils that contain significant amounts of gravel and rock fragments. In such situations, wind and water erosion can remove most of the sand and fine sediments from the surface, leaving the remaining rock fragments as the predominant surface layer.

3.10 ENERGY AND MINERAL RESOURCES

This section discusses energy and mineral resources relevant to the analysis of impacts from the proposed project and alternatives. The environmental baseline for considering impacts of the Desert Harvest Solar Project (DHSP) to energy and mineral resources is defined as the existing physical conditions at the commencement of analysis in September 2011. The project study area addressed in this section includes lands that may be affected directly and/or indirectly by construction, operation and decommissioning of the DHSP.

3.10.1 Applicable Plans, Policies, and Regulations

Existing laws and regulations applicable to mineral resources are described below. In some cases, compliance with these existing laws and regulations would serve to reduce or avoid certain impacts that might otherwise occur with the implementation of the proposed project or alternatives.

Federal

General Mining Act of 1872

This act authorizes and governs prospecting and mining for economic minerals, such as gold, platinum, and silver, on federal public lands. Under the Act, all citizens of the United States of America 18 years or older have the right under to locate a lode (hard rock) or placer (gravel) mining claim on federal lands open to mineral entry. These claims may be located once a discovery of a locatable mineral is made. Locatable minerals include but are not limited to platinum, gold, silver, copper, lead, zinc, uranium, and tungsten.

Mining and Mineral Policy Act of 1970

This Act establishes that the federal government encourages private enterprise in the development of a sound and stable domestic mineral industry and orderly economic development of mineral resources, research, and reclamation methods.

California Desert Conservation Area Plan

The California Desert Conservation Area (CDCA) Plan defines multiple-use classes for BLM-managed lands within the CDCA. This area encompasses the project study area. With respect to geological resources, the CDCA Plan aims to maintain the availability of mineral resources on public lands for exploration and development.

Geothermal Steam Act of 1970

The Geothermal Steam Act of 1970, as amended, (84 Stat, 1566; 30 U.S.C. 1001-1025) provides the Secretary of the Interior with the authority to lease public lands and other federal lands, including National Forest lands, for geothermal exploration and development in an environmentally sound manner. This authority has been delegated to the BLM, which implements the Act through the regulations contained in 43 Code of Federal Regulations (CFR) Part 3200 (BLM 2011a).

State

State Surface Mining and Reclamation Act (SMARA) of 1975

The Surface Mining and Reclamation Act of 1975 (SMARA) mandates that the State Geologist initiate mineral land classification in order to help identify and protect mineral resources in areas subject to urban expansion or other irreversible land uses which would preclude mineral extraction. SMARA also allows the State Mining and Geology Board (SMGB), after receiving classification information from the State Geologist, to designate lands containing mineral deposits of regional or statewide significance. Mineral lands are mapped according to jurisdictional boundaries (i.e., counties), mapping all mineral commodities at one time in the area, using the California Mineral Land Classification System.

The objective of mineral resource classification and designation is to ensure that mineral deposits of statewide or regional significance are available when needed. The SMGB, based on recommendations from the State Geologist and public input, prioritizes areas to be classified and/or designated. Areas subject to urban expansion or other irreversible land uses are given the highest priority.

Classification into mineral resource zones (MRZ) is completed by the State Geologist in accordance with the SMGB's priority list. Classification of these areas is based on geologic and economic factors without regard to existing land use and land ownership. The following MRZ categories are used by the State Geologist in classifying the State's lands:

- MRZ-1: Areas where the available geologic information indicates no significant mineral deposits or a minimal likelihood of significant mineral deposits.
- MRZ-2a: Areas where the available geologic information indicates that there are significant mineral deposits.
- MRZ-2b: Areas where the available geologic information indicates that there is a likelihood of significant mineral deposits.
- MRZ-3a: Areas where the available geologic information indicates that mineral deposits are likely to exist, however, the significance of the deposit is undetermined.
- MRZ-4: Areas where there is not enough information available to determine the presence or absence of mineral deposits.

If new information becomes available for a MRZ, such as through sampling or mining exploration, re-classification of that MRZ can occur. For example, a MRZ-4 classification could be re-classified to any of the other MRZ classifications. The area within the proposed solar facility boundary is currently classified as MRZ-4, which indicates areas with not enough information to determine the presence or absence of minerals (RCIP 2011).

California Renewables Portfolio Standard / Senate Bills 1078 (2002), 107 (2006), and 2 (2011)

The California Renewables Portfolio Standard (RPS) was established in 2002 under Senate Bill 1078, accelerated in 2006 under Senate Bill 107, and expanded in 2011 under Senate Bill 2. The RPS program is one of the most ambitious renewable energy standards in the U.S., requiring investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procure-

ment by 2020. The California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) jointly implement the RPS program.

Local

County of Riverside General Plan

Policies

Wind Resources

- OS 10.1 Provide for orderly and efficient wind energy development in a manner that maximizes beneficial uses of the wind resource and minimizes detrimental effects to the residents and the environment of the County.
- OS 10.2 Continue the County's Wind Implementation Monitoring Program (WIMP) in order to study the evolution of wind energy technology, identify means to solve environmental and community impacts, and provide for an ability to respond with changes in the County's regulatory structure.

Solar Energy

- OS 11.1 Enforce the state Solar Shade Control Act, which promotes all feasible means of energy conservation and all feasible uses of alternative energy supply sources.
- OS 11.2 Support and encourage voluntary efforts to provide active and passive solar access opportunities in new developments.
- OS 11.3 Permit and encourage the use of passive solar devices and other state-of-the-art energy resources.

Geothermal and Fossil Fuels

- OS 12.1 Allow for the development of non-electrical, direct heat uses of geothermal heat and fluids for space, agricultural, and industrial heating in situations and localities where naturally occurring hydrothermal features will not be degraded.
- OS 12.2 Base all geothermal decisions on appropriate data relating to anticipated environmental, cultural, aesthetic, archaeological and social impacts.
- OS 12.3 Weigh the benefits of geothermal as a viable energy source against the protection of hot springs, geysers, thermal pools, and other thermal features for their ecological, educational, and recreational values.
- OS 12.4 Permit geothermal heat utilization for space heating in buildings.
- OS 15.1 Enforce California Division of Oil and Gas policies that direct the siting of oil and gas facilities in urban and non-urban areas.
- OS 15.2 Development of renewable resources should be encouraged.

Mineral Resources

- OS 14.1 Require that the operation and reclamation of surface mines be consistent with the State Surface Mining and Reclamation Act (SMARA) and County Development Code provisions.

- OS 14.2 Restrict incompatible land uses within the impact area of existing or potential surface mining areas.
- OS 14.3 Restrict land uses incompatible with mineral resource recovery within areas designated Open Space-Mineral Resources.
- OS 14.4 Impose conditions as necessary on mining operations to minimize or eliminate the potential adverse impact of mining operations on surrounding properties, and environmental resources.
- OS 14.5 Require that new non-mining land uses adjacent to existing mining operations be designed to provide a buffer between the new development and the mining operations. The buffer distance shall be based on an evaluation of noise, aesthetics, drainage, operating conditions, biological resources, topography, lighting, traffic, operating hours, and air quality.

3.10.2 Energy and Mineral Resources Existing Conditions

The BLM processes applications for wind, solar, geothermal, and fossil fuel energy exploration and production; the affected environment for these energy resources as well as mineral resources is characterized in this section.

Wind and Solar Resources

Wind power uses the naturally occurring energy of the wind for purposes including generating electricity, charging batteries, and pumping water. Utility-scale wind turbines, which capture the kinetic energy of the wind and convert it into electrical energy, are mounted on tall towers, usually 200 feet or more above the earth's surface. In utility-scale power applications, multiple turbines are connected to the utility grid. The BLM manages 20.6 million acres of public lands with wind potential in 11 western states, including California and the region where the proposed project site is located. A Programmatic EIS relating to the authorization of wind energy projects was completed in June 2005, which provided an analysis of the development of wind energy projects in the West. In addition, the BLM amended 52 land use plans to allow for the use of applicable lands for wind energy development, and issued a wind energy policy in 2006 to provide guidance on best management practices (BMP) and measures to mitigate potential impacts on birds, wildlife habitat, and other resource values. (BLM 2011b)

Solar radiation levels in the Southwest and the project study area are some of the best in the world, and the BLM manages 22 million acres of public lands with solar potential in 6 states, including California. As described in Section 1.1 of the Plan of Development for the proposed DHSP, the area of the Mojave Desert where the solar facility site is located ranks among the highest insolation values (solar radiation energy received on a given surface area in a given time) in North America, with a corresponding benefit to net capacity factor projections. Solar and wind energy development on BLM-administered lands can be approved under Title V of the Federal Land Policy and Management Act (FLPMA). (BLM 2011c)

As described in Section 2.2, the BLM and the DOE have published the "Draft Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States" (Solar PEIS). For the BLM, the PEIS is evaluating the agency's proposed actions to establish a new BLM Solar Energy Program applicable to utility-scale solar energy development on BLM-administered lands in six southwestern states (Arizona, California, Colorado, Nevada, New

Mexico, and Utah). For DOE, the PEIS evaluated the agency's proposed action to develop new program guidance relevant to DOE-supported solar projects. The project study area is in a Draft PEIS-designated proposed Solar Energy Zone or SEZ (the Riverside East SEZ).

Geothermal and Fossil Fuel Resources

Geothermal resources refer to thermal energy which is generated and stored beneath the surface of the earth, and may be accessed via drilling operations towards the purpose of generating power. Fossil fuels are natural resources including petroleum, natural gas, and coal, which also may be extracted from the earth and consumed (burned) to generate power. There are no known coal mining activities in Riverside County or the project study area. There are 70,361 producing acres under oil and gas leases on BLM-administered lands in California, and there are 14,720 producing acres under geothermal leases on BLM lands in the State (BLM 2005).

Geothermal and fossil fuel resources in the project study area were identified using a map produced by the California Department of Conservation (2001), and through review of the Riverside County General Plan (2008), and are summarized below.

- One geothermal field has been identified in western Riverside County (Desert Hot Springs), west of the proposed solar facility site, and several have been identified in central and southern Imperial County (Salton Sea; Brawley; Mesquite; Heber; East Mesa) (DOC 2001). Currently there is no active geothermal energy production in Riverside County, including the project study area; however, as mentioned, geothermal resources are known to exist in the County (RCIP 2008).
- Riverside County's petroleum resources are deposited in the form of oil and gas seeps (RCIP 2008). The Imperial Valley Basin, which encompasses the Salton Sea and is aligned in a northwest to southeast orientation through Riverside and Imperial Counties, continuing into Mexico, is identified as a "sedimentary basin with oil, gas, or geothermal production;" this basin is located to the west and southwest of the project study area and does not encompass the solar facility site (DOC 2001). The State Division of Oil and Gas does not report significant or active petroleum extraction in the County (RCIP 2008).

There are no geothermal, oil, or gas producers or seeps within 5 miles of the solar facility site.

Mineral Resources

The BLM groups minerals on federal lands into three distinct categories: (1) Locatable resources (subject to the General Mining Law of 1872, as amended); (2) Leasable resources (subject to various Mineral Leasing Acts); and (3) Salable resources (subject to mineral materials disposed of under the Materials Act of 1947, as amended) (BLM 2011d).

- **Locatable minerals** include hard rock resources that are typically metals with a unique or special use, such as gold and silver.
- **Leasable minerals** include those which are typically found in bedded deposits, such as oil, gas, and geothermal resources.
- **Salable minerals** include common variety of materials such as sand, stone, and gravel.

Local BLM Field Offices are responsible for selling mineral materials on public lands; for lands in the vicinity of the proposed project and alternatives, the Palm Springs–South Coast Field

Office has this responsibility (BLM 2011d). Leasable minerals relevant to the solar facility site and vicinity are previously discussed under "Geothermal and Fossil Fuels." Locatable and salable minerals are discussed below.

As mentioned in Section 3.10.1, the solar facility site is currently designated MRZ-4, as classified by the State Geologist in accordance with the SMGB's priority list. This designation indicates areas where there is not enough information available to determine the presence or absence of mineral deposits. The Mineral Resources Data System (MRDS), administered by the U.S. Geological Survey (USGS), provides data to describe metallic and nonmetallic mineral resources, including deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references (MRDS 2011). The MRDS online database was reviewed for the project study area, and records of surface mines, closed mines, occurrences/ prospects, and unknown/undefined resources within 5 miles of the proposed solar facility site are identified below in Table 3.10-1.

Table 3.10-1. Mineral Resources in the Project Study Area

Distance/Proximity to Solar Facility Site	MRDS Record #	Site Name	Commodity	Operation Type	Development Status
2.25 mi to southwest	10140398	Granite mine	Gold	Surface – underground	Past producer
3 mi to east	1026155	Gravel pits	Sand and gravel	Surface	Past producer
4.5 mi to south (adjacent to gen-tie Alts B & C)	10261788	H&K mine	Talc-soapstone	Surface	Past producer

Source: MRDS 2011

As shown in Table 3.10-2, the MRDS identifies 3 records within 5 miles of the solar facility site, all of which are past producers. There are numerous records identified by the MRDS as "Occurrence, Prospect, or Unknown" located south of Interstate 10, more than 7 miles south of the solar facility site (MRDS 2011); one of these records occurs adjacent to gen-tie line Alternative B and C. In addition, there are records identified by the MRDS 7 miles to the northwest of the solar facility site and more than 12 miles to the east site (MRDS 2011). There are no known locatable or salable mineral resources within the solar facility site boundary, and no current producers of mineral resources within 5 miles of the solar facility site.

Energy and Mineral Resources Used for the DHSP

Table 3.10-2 identifies metallic mineral, nonmetallic mineral, and gravel / concrete resources that would be used during construction of the DHSP. Metallic minerals would predominantly be used to produce steel and aluminum. Copper and other metallic minerals would be contained in the transformer, switchyard, and transmission line. Silica, cadmium, and tellurium may be contained in the PV panels, depending on the technology that is used.

Table 3.10-2. Mineral Resources Contained in Project Construction Materials

Project Structures and Facilities	Metallic Minerals	Non-Metallic Minerals	Gravel/ Concrete
PV Panels	x	x	
PV Panel Structures	x		x
O&M Building / Facility	x		x
Electrical Collection System	x		
On-Site Substation	x		x
Switchyard	x		x
Site Security, Fencing, and Lighting	x		x
Access Roads			x
Groundwater Well(s)	x		x
Electrical Interconnection	x		

As described in Section 2.4.4 of this EIS (see "Gravel, Aggregate, and Concrete Requirements and Sources"), gravel would be trucked to the solar facility site from a location to be determined. Concrete would be required for the inverter pads and the switchyard. Concrete for the inverter pads and vertical H-pile supports, if needed, would be pre-poured and transported to the solar facility site by truck, while concrete for the switchyard and panel supports would be brought by cement truck to the site. The DHSP would also require consumption of fossil fuels for construction vehicles as well as operations/maintenance vehicles; Sections 2.4.4 and 2.4.5 (Description of the Proposed Action and Alternatives) of this EIS describe construction activities, including as related to vehicle and equipment use, while Sections 3.2 and 4.2 (Air Quality) and Sections 3.5 and 4.5 (Climate Change) of this EIS provide specifics regarding the proposed project's fuel consumption and emissions.

3.11 LANDS AND REALTY

This section describes conditions related to land use and realty in the area that could be affected by the implementation of the proposed project and alternatives. The project study area for lands and realty is the California Desert Conservation Area (CDCA) and private lands within the Chuckwalla Valley, as this is the planning area that would be affected by the proposed project and alternatives.

3.11.1 Applicable Plans, Policies, and Regulations

This section discusses the applicable regulations, plans, and policies that govern land use within the project study area.

California Desert Conservation Area Plan 1980 (as amended)

The principal land use plan affecting the DHSP is the BLM's CDCA Plan. The CDCA Plan is described in Section 1.7 of Chapter 1.

Northern and Eastern Colorado Desert Coordinated Management Plan

The Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan) is a Habitat Conservation Plan and amendment to the CDCA Plan that provides:

- A comprehensive framework for ecosystem management, including recovery of three populations of the desert tortoise;
- A single landscape basis for ecosystem management for three federal land administering agencies within the planning area: BLM, Joshua Tree National Park (eastern half only), and all of Chocolate Mountains Gunnery Range managed by the U.S. Navy; and
- A structure that integrates ecosystem management into a broader context of agencies' mandates, including BLM's multiple use management mission.

The NECO planning area consists of 5.5 million acres, covering portions of BLM field offices in Needles, El Centro, and Palm Springs. The plan amendment is also cooperatively joined by the California Department of Fish and Game through the statewide Sikes Act Memorandum of Agreement.

Riverside County Integrated Plan and Desert Center Area Plan

The principal land use plan affecting private land surrounding the solar facility site is the Riverside County General Plan (General Plan), which articulates the vision and planning principles for development in Riverside County. The Desert Center Area Plan (DCAP) is part of the General Plan and provides a more focused development plan for the Desert Center area, which includes the solar facility site and gen-tie line alternatives. In addition, the General Plan defines development policies for the Desert Center Policy Area, which is generally between Desert Center and Lake Tamarisk.

Current Riverside County plans, policies, and regulations do not take into account the County's significant solar resource. However, the County recognizes that its current General Plan does not address siting utility-scale solar facilities and that policy conflicts may exist. The County plans

to address siting of solar projects and will clarify these issues in a General Plan update and in future County Code revisions (CEC and BLM 2010).

The California Land Conservation Act of 1965

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, was enacted to preserve California's prime agricultural lands from urbanization. Since it was enacted, the act has been amended several times to allow its use not only to protect prime agricultural lands. Riverside County has identified soils in one gen-tie line alternative route, Alternative D, where it crosses Rice Road, as Williamson Act Non-Prime Agricultural Land (California Department of Conservation, Division of Land Resources Protection 2007). These are lands that are enrolled in a California Land Conservation Act contract and do not meet the criteria as Prime Agricultural Land. Non-Prime Farmland is defined as open space land of statewide significance under the California Open Space Subvention Act. Most non-prime lands are in agricultural uses, such as grazing or non-irrigated crops. Non-prime lands may also include other open space uses that are compatible with agriculture and consistent with local general plans (California Department of Conservation, Division of Land Resources Protection 2007).

California Desert Renewables Energy Conservation Plan (DRECP)

The DRECP is a Natural Community Conservation Plan being developed by a joint federal and State Renewable Energy Action Team (REAT) to provide for effective protection and conservation of desert ecosystems while allowing for the appropriate development of renewable energy projects. The REAT Team was formed consisting of the California Energy Commission, California Department of Fish and Game, Bureau of Land Management, and the U.S. Fish and Wildlife Service. The DRECP is intended to provide long-term endangered species permit assurances, facilitate the review and approval of renewable energy projects in the Mojave and Colorado deserts in California, and provide a process for conservation funding to implement the DRECP. It is anticipated that the DRECP also would serve as the basis for one or more habitat conservation plans (HCP) under the federal Endangered Species Act (ESA) and provide biological information necessary for consultation under ESA Section 10. The DRECP is not yet final, and no decision has been made for the DRECP. The conservation measures of this EIS are not inconsistent with the DRECP's goals.

Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development (Solar PEIS)

In response to direction from Congress under Title II, Section 211 of the Energy Policy Act of 2005, as well as Executive Order 13212, Actions to Expedite Energy-Related Projects, the BLM and the DOE have collaborated to prepare the Solar PEIS pursuant to NEPA and CEQA regulations. The Solar PEIS evaluates utility-scale solar energy development in a six-state area, including that portion of the CDCA that is open to solar energy development in accordance with the provisions of the CDCA Plan. The planning area does not include lands within the CDCA that have special designations, such as National Monuments, Wilderness Areas, Wilderness Study Areas, Wild and Scenic Rivers, National Historic and Scenic Trails, Areas of Critical Environmental Concern, or other special management areas that are inappropriate for or inconsistent with extensive, surface-disturbing uses. The Solar PEIS is not intended to cover "pending applications," which includes Desert Harvest, since the Final PEIS had not been released as of the date of publication of the DHSP Draft EIS. Therefore, this Final EIS is not required to show

compatibility with the Solar PEIS. However, the DHSP lies within the boundaries of the Riverside East SEZ and occurs on land defined by the PEIS as developable.

Federal Power Act

Under the section 24 of the Federal Power Act (FPA), the following actions result in a withdrawal of public land: the filing of an application for (or issuance of) a preliminary permit with the Federal Energy Regulatory Commission (FERC) or the filing of an application for a license (with FERC) and the issuance of a license by FERC. A withdrawal created under the Federal Power Act on BLM-managed land would reserve the public land for use by a pending power project, and BLM would recognize that the licensee has a priority right to use the withdrawn lands. BLM has the authority to authorize ROW on the withdrawn land, but any ROW cannot infringe on the licensee's priority right to use the land. Section 3.11.3 describes an existing FERC withdrawal under the FPA over portions of the DHSP ROW application area.

3.11.2 Existing Conditions

Land use can be assessed by analyzing current land activities, land ownership, zoning (where applicable), and land use designations in adopted land use plans and policies. An assessment of land use must also consider legal guarantees or limitations on land use, such as those provided by easements, deeds, rights-of-way (ROW), claims, leases, licenses, and permits. BLM-administered lands are not zoned, but they may be encumbered by easements, ROWs, mining claims, and permits.

General Characteristics of Land in the Project Study Area

The area in the immediate vicinity of the solar facility and gen-tie line alternatives is largely a vacant, undeveloped, and flat open space area located in the Chuckwalla Valley of the Sonoran Desert in eastern Riverside County. Development in the surrounding area includes the rural community of Desert Center, California; Lake Tamarisk Desert Resort; the Eagle Mountain Mine; and the Desert Sunlight Solar Farm, an approved neighboring solar project that was under construction of its Phase 1A area as of the commencement of analysis in this EIS (September 2011). The environmental baseline for the proposed project and alternatives includes only the preliminary construction of the Desert Sunlight Solar Farm project that had been completed as of September 2011. Joshua Tree National Park, which is managed by the National Park Service and is largely designated as wilderness, surrounds the majority of the solar facility site to the west, north, and east. The general characteristics of the project study area are described in Chapter 1.

Land Ownership/Management

Figure 3.11-1 in Appendix A depicts the current land ownership in the vicinity of the proposed project and alternatives, as reported by the BLM (BLM 2011). The DHSP would be located chiefly on land that is under the jurisdiction of the BLM, and BLM land use designations established in the CDCA and NECO Plans would apply.

Portions of gen-tie line Alternatives B, C, D, and E would traverse private land. Gen-tie line Alternatives B, C, D, and E would cross parcels owned in fee by the Metropolitan Water District of Southern California (MWD). Gen-tie line Alternatives B and C would also cross one parcel

of private land near Lake Tamarisk. Table 3.11-1 provides information about private land ownership in the vicinity of the proposed project and alternatives.

Table 3.11-1. Land Ownership of Lands Overlain by the Proposed Project and Alternatives

Project Component	Private Land Crossed	Assessor Parcel Numbers
Solar Facility – Alts 3, 4, 5	None	Not applicable
Gen-Tie – Alts B, C	0.6 mile	807171005, 808161001
Gen-Tie – Alt D	5.1 miles	807172029, 811270001, 811142005, 811141011, 811260013, 811170013, 811170018, 811170017, 811170016, 808250015, 808250016, 808250005, 808240010, 808240008, 808240007, 811170019, 808250014, 808250003, 808240011, 808240012, 808250004
Gen-Tie – Alt E	4.25 miles	807172017, 807172018, 807191031, 807191030, 811122010, 811130019, 811160016

Source: BLM 2011; enXco 2011

BLM Land Use Designations

The BLM's CDCA establishes four multiple use classes (MUC), multiple use class guidelines, and plan elements for specific resources or activities, such as motorized vehicle access, recreation, and vegetation. Figure 3.11-1 in Appendix A depicts the multiple use classes assigned to BLM-administered land in the DHSP area, as designated in the NECO Plan. The multiple use classes are defined as follows:

- **Class C** (Controlled Use) – About 2.1 million acres designated Class C are managed to be preserved in a natural state; access generally is limited to nonmotorized and nonmechanized means, such as by foot or on horseback.
- **Class L** (Limited Use) – About 5.9 million acres designated Class L are managed to protect sensitive, natural, scenic, ecological, and cultural resource values. They provide for generally lower intensity, carefully controlled, multiple uses that do not significantly diminish resource values.
- **Class M** (Moderate Use) – About 3.3 million acres designated Class M are managed in a controlled balance between higher intensity use and protection. A wide variety of uses such as mining, livestock grazing, recreation, energy, and the development of new utility facilities are allowed.
- **Class I** (Intensive Use) – About 500,000 acres are Class I, managed for concentrated use to meet human needs. Reasonable protection is provided for sensitive natural values. Impacts are mitigated and impacted areas are rehabilitated, when possible.

The solar facility as well as most of the gen-tie line would be located on land designated by BLM Class M (Moderate Use). A portion of the gen-tie line Alternative E would cross areas designated as Class L, and all gen-tie line alternatives would cross a very small area of land designated as Class L upon entry into the Red Bluff Substation.

Riverside County General Plan Land Use Designations

Where the DHSP would be located on private land, the Riverside County General Plan land use designations would apply. In addition, all of the private land within the DHSP is subject to Riv-

erside County ordinances, the DCAP, and the Desert Center Policy Area, as applicable based on the location of individual parcels.

A 0.6-mile section of gen-tie line Alternative B and Alternative C, 5.1 miles of gen-tie line Alternative D, and 4.25 miles of gen-tie line Alternative E would be on private land designated as "Open Space–Rural (OS-RUR)." According to the General Plan:

> *The Open Space–Rural land use designation is applied to remote, privately owned open space areas with limited access and a lack of public services. Single-family residential uses are permitted at a density of one dwelling unit per 20 acres. The extraction of mineral resources subject to an approved surface mining permit may be permissible, provided that the proposed project can be undertaken in a manner that is consistent with maintenance of scenic resources and views from residential neighborhoods and major roadways and that the project does not detract from efforts to protect endangered species (Riverside County 2003).*

Relevant land use policies of the General Plan for Open Space-Rural (OS-RUR) are as follows:

- LU 20.1 – Require that structures be designed to maintain the environmental character in which they are located.
- LU 20.2 – Require that development be designed to blend with undeveloped natural contours of the site and avoid an unvaried, unnatural, or manufactured appearance.
- LU 20.3 – Require that adequate and available circulation facilities, water resources, sewer facilities, and/or septic capacity exist to meet the demands of the proposed land use.
- LU 20.4 – Ensure that development does not adversely impact the open space and rural character of the surrounding area.
- LU 20.6 – Provide programs and incentives that allow Open Space-Rural areas to maintain and enhance their existing and desired character (Riverside County 2003).

Gen-tie line Alternative D would also traverse 1.5 miles of land designated Agriculture (AG). According to the General Plan:

> *The Agriculture land use designation has been established to help conserve productive agricultural lands within the County. These include row crops, nurseries, citrus groves and vineyards, dairies, ranches, poultry and hog farms, and other agricultural related uses. Areas designated for Agriculture generally lack an infrastructure that is supportive of urban development (Riverside County 2003).*

Relevant land use policies of the General Plan for Agriculture (AG) are as follows:

- LU 16.1 – Encourage retaining agriculturally designated lands where agricultural activity can be sustained at an operational scale, where it accommodates lifestyle choice, and in locations where impacts to and from potentially incompatible uses, such as residential uses, are minimized, through incentives such as tax credits.
- LU 16.2 – Protect agricultural uses, including those with industrial characteristics (dairies, poultry, hog farms, etc.) by discouraging inappropriate land division in the immediate proximity and allowing only uses and intensities that are compatible with agricultural uses.

- LU 16.4 – Encourage conservation of productive agricultural lands. Preserve prime agricultural lands for high-value crop production.
- LU 16.5 – Continue to participate in the California Land Conservation Act (the Williamson Act) of 1965.
- LU 16.6 – Require consideration of State agricultural land classification specifications when a 2.5-year Agriculture Foundation amendment to the General Plan is reviewed that would result in a shift from an agricultural to a non-agricultural use.
- LU 16.7 – Adhere to Riverside County's Right-to-Farm Ordinance (Riverside County 2003).

Riverside County Zoning

Where the proposed project would be located on private land, Riverside County zoning would apply. Zoning classifications are defined in the Riverside County Land Use Ordinance, Ordinance 348, as amended, Article III. The ordinance details all permitted uses on private property based on the assigned zone classification.

Gen-tie line Alternatives D and E would cross private land zoned as Controlled Development Zone (W-2-10). Permitted uses include single-family dwellings, field and tree crops, outside storage of materials, and limited animal husbandry. Limited additional uses are permitted where the lot size is greater than 1 acre. Many additional uses are allowed by approval or by permit, including "structures and the pertinent facilities necessary and incidental to the development and transmission of electrical power" (BLM 2011).

Alternative D would also overlap private land zoned Agriculture, Light (A-1-20). As the name implies, a variety of agricultural land uses are permitted here. No power-generating facilities are permitted, but, in accordance with Section 13.1(11)(d), the Planning Director can approve uses that are deemed to be "substantially the same in character and intensity" as the listed uses (BLM 2011).

A 0.6-mile portion of Alternatives B and C would overlap one parcel of private land near Lake Tamarisk zoned Natural Assets (N-A). Permitted uses in areas zoned Natural Assets include some dwellings and accessory buildings, field and tree crops, grazing subject to stated limitations, and apiaries. Several other uses, including utility substations, are allowed by approval or by permit (BLM 2011).

3.11.3 Existing Uses

Lands and Realty-Related Uses

A number of easements, ROWs, and claims related to utility corridors, transmission lines, telephone lines, pipelines, railroads, roads, water transmission facilities, and mining claims are located in the vicinity of the solar facility. Land ownership is shown in Table 3.11-1. The solar facility site is entirely owned by the federal government and managed by BLM. A portion of the site is part of the BLM's Palen Ford Wildlife Habitat Management Area (WHMA). This portion of the site is excluded from Alternative 5 (see Figure 2-9 in Appendix A). The southwestern portion of the solar facility site is encumbered with prior authorizations and segregations. Two transmission line ROWs are held by Southern California Edison.

One road, pipeline, and a proposed transmission line ROW are held under a project under review by FERC for a transmission line and water pipeline associated with the Eagle Mountain Pumped Storage Project (EMPSP, "Power Project P-13123") (see Figure 2-3a for overlap with DHSP). A preliminary permit for this project was issued by FERC on August 13, 2008, but expired on August 13, 2011. The final license application for this project, dated June 22, 2009, is pending with FERC. The current FERC withdrawal is based on the Eagle Mountain Pumped Storage project boundary in maps submitted with the application for license. A letter from FERC to the project proponent dated March 15, 2012 vacated "non-essential withdrawals" and withdrawals outside project boundary as of September 30, 2011. This letter vacates the portion of the withdrawal created by the preliminary permit that is outside the project boundary as defined in the license application. The effect of this withdrawal is to reserve public lands for future use for a water pipeline by the licensee of Power Plant Project P-13123, if authorized under the FPA. BLM has the authority to issue ROW grants on the withdrawn land, but any ROW cannot infringe on the licensee's priority right to use the land. Several DHSP components would cross over the 145-foot-wide linear withdrawal for the buried water supply line and the withdrawal for an alternative transmission line route for the EMPSP. Overlapping DHSP components include

- The main access driveway from Kaiser Road to the DHSP (on the northern parcel);
- Interior access roads and electrical collector lines;
- The buried collector line between the southern and northern parcels; and
- Gen-tie Alternatives B, C, and D.

The gen-tie alternatives would cross the EMPSP water supply withdrawal on public land, but would cross the transmission alternative route on private land owned by the MWD and not subject to Section 24 of the FPA. Overall, the only DHSP components in EMPSP withdrawal areas on public lands would be power lines and unpaved access roads. BLM has determined that these facilities would not preclude use of public lands by the EMPSP (see Appendix P for full text of letter from BLM to FERC).

Land uses within the routes of the gen-tie line alternatives are shown in Table 3.11-2. The gen-tie line alternatives would cross two major transmission lines. The Kaiser 33-kilovolt (kV) transmission line, owned by Kaiser Ventures, runs parallel to Kaiser Steel Road. Several of the gen-tie line alternatives would cross SCE's existing 161 kV transmission line, which runs northwest to southeast. In addition, the Devers–Palo Verde No. 1 (DPV1) 500 kV transmission line runs parallel to Interstate 10. There are a number of smaller distribution lines that cross DHSP components as well.

In addition to ROWs for existing roads and transmission lines, portions of all of the gen-tie line alternatives would cross a designated two-mile-wide utility corridor (see Figure 3.11-1 in Appendix A). There are also multiple ROWs for existing underground oil and gas pipelines and telephone cables in the vicinity of the gen-tie line alternatives, as well as a ROW for a gas distribution pipeline, which parallels Kaiser Road. Twelve water wells and associated pipelines are within the vicinity of the DHSP. Two of the wells are owned by Kaiser Steel and the others are owned by private parties. West of gen-tie line Alternative B and Kaiser Road, the Riverside County Waste Management Department leases 160 acres from the BLM for a sanitary landfill.[1]

[1] Specific plans for a sanitary landfill are approved but are not currently in effect.

The lease, serial number CAS005340, was authorized in 1975 (BLM 2011). Land disturbance is evident in this area (BLM 2011).

Table 3.11-2. Existing Uses, Easements, and ROW Within Gen-Tie Line Alternative Routes

Owner	Use	Width (feet)	Location Relative to DHSP	BLM Serial File No.
Riverside County	Kaiser Road	300	Kaiser Road easement; Alternatives B and C would cross.	Not applicable
FERC	Transmission and Water Supply ROW	400	Northwest to Southeast through the Southwestern DHSP parcel; other overlaps with Gen-Tie Line Alternatives	P-13123-002
MWD	ROW for ditches and canals	Not applicable	All Gen-Tie Lines would cross.	R 07041
SCE	Transmission line	100	Northwest to southeast east of Kaiser Road; all Gen-Tie Lines would cross; Alternative D would parallel it for much of its length.	LA 0149780
SCE	Transmission line	25	Northwest to southeast east of Kaiser Road; all Gen-Tie Lines would cross; Alternative D would parallel it for much of its length.	LA 0153144
Caltrans	I-10	200	Road easement; all Gen-Tie lines would cross.	Not applicable
Caltrans	SR-177 (Desert Center Rice Road)	100	Road easement; all Gen-Tie Lines would cross.	Not applicable
SCE	Water pipeline and well	50	Alternatives B and C would cross.	LA 098376
Sprint	Underground telephone cable	15	All Gen-Tie Lines would cross.	CA 18888
Private owner	Private access road	12	Alternatives B and C would cross and parallel for part of length.	CA 37076
Kaiser Ventures, Inc.	Eagle Mountain Railroad	200	No project components would cross.	Not applicable

Source: BLM 2011

The solar facility would be sited within a proposed Solar Energy Zone to be designated under the Department of Energy and BLM Programmatic Solar Energy Development EIS (Office of Energy Efficiency and Renewable Energy and Bureau of Land Management, 2010). It is also within a California Renewable Energy Zone identified by the Renewable Energy Transmission Initiative. The DHSP site is also in a priority interconnection location within the California Independent System Operator; it would interconnect to the existing 500 kV transmission line, SCE's DPV1 Line.

3.12 NOISE AND VIBRATION

This section describes the existing noise conditions that could be affected by implementation of the proposed Desert Harvest Solar Project (DHSP) and alternatives. The project study area for noise encompasses all noise-sensitive land uses in the vicinity of the DHSP and noise-sensitive land uses along the traffic routes that would be used during construction, operation, and decommissioning.

Noise is defined as unwanted or extraneous sound. Sound is caused by vibrations that generate waves of minute air pressure fluctuations. Air pressure fluctuations that occur from 20 to 20,000 times per second can be detected as audible sound. The number of pressure fluctuations per second is normally reported as cycles per second or hertz (Hz). Different vibration frequencies produce different tonal qualities for the resulting sound. In general, sound waves travel away from the noise source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source.

Decibel Scales

Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hz, less sensitive to higher and lower sound frequencies, and least sensitive to sound frequencies below 250 Hz. Peak sensitivity to pure tones typically occurs at frequencies between 2,000 Hz and 6,000 Hz. Relative sensitivity remains fairly high between about 250 Hz and 2,000 Hz. Relative sensitivity drops off slightly above 7,000 Hz, and drops off significantly below 200 Hz. In addition, relative sensitivity to different acoustic frequencies also varies with the intensity of the sound. Several different frequency weighting schemes have been developed, using different decibel (dB) adjustment values for each octave or 1/3 octave interval. Some of these weighting schemes are intended to approximate the way the human ear responds to noise levels; others are designed to account for the response of building materials to airborne vibrations and sound. The most commonly used decibel weighting schemes are the A-weighted and C-weighted scales.

The "A-weighted" decibel scale (dBA) is normally used to approximate human hearing response to sound. The A-weighted scale significantly reduces the measured pressure level for low frequency sounds while slightly increasing the measured pressure level for some middle frequency sounds. The "C-weighted" decibel scale (dBC) is often used to characterize low frequency sounds capable of inducing vibrations in buildings or other structures. The C-weighted scale makes only minor reductions to the measured pressure level for low frequency components of a sound while making slightly greater reductions to high frequency components than does the A-weighted scale.

Table 3.12-1 provides examples of typical dBA levels.

Table 3.12-1. Examples of Typical dBA Levels

Characterization	dBA	Example Noise Condition
Threshold of pain	130	Peak noise 50 feet behind firing position, M-16 and M-24 rifles.
	125	Mach 1.9 sonic boom under aircraft at 11,000 feet.
Possible building damage	120	Air raid siren at 50 feet.
Threshold of immediate NIPTS[1]	115	Mach 1.1 sonic boom under aircraft at 12,000 feet.
	110	Commercial fireworks (5 pound charge) at 1,500 feet.

Table 3.12-1. Examples of Typical dBA Levels

Characterization	dBA	Example Noise Condition
	105	Peak noise 50 feet behind firing position, .22 caliber rifle.
	100	Peak crowd noise, pro football game, inside open stadium.
Extremely noisy	95	Locomotive horn at 100 feet.
8-hour OSHA[2] limit	90	Large wood chipper processing tree branches at 30 feet.
Very noisy	85	Leaf blower at 5 feet.
	80	Jackhammer at 50 feet.
Noisy	75	Dog barking at 5 feet.
	70	Gas engine lawnmower at 5 feet.
Moderately noisy	65	Bulldozer, excavator, or paver at 50 feet.
	60	Pneumatic wrench at 50 feet.
	55	Fork lift or front end loader at 50 feet.
	50	Table saw at 25 feet.
Quiet	45	Vacuum cleaner at 5 feet.
	40	Idling locomotive at 50 feet.
	35	Street sweeper at 30 feet.
Very Quiet	30	Leaf blower at 50 feet.
	20	300 feet from busy 6-lane freeway.
Barely Audible	10	Typical daytime busy downtown background conditions.
Threshold of hearing, no hearing loss	0	

1 - NIPTS = noise-induced permanent threshold shift (permanent hearing damage)
2 - OSHA = Occupational Safety and Health Administration
Indicated noise levels are average dBA levels for stationary noise sources or peak noise levels for brief noise events and noise sources moving past a fixed reference point.
Average and peak dBA levels are not 24-hour CNEL (community noise exposure level) or Ldn (day-night noise level) values.
Decibel scales are not linear. Apparent loudness doubles with every 10 dBA increase, regardless of the initial dBA level.
Most adults have accumulated some hearing loss and have a threshold of hearing above 15 dBA. In occupational hearing conservation programs, a threshold of hearing between 20 and 30 dBA is considered normal.
Source: Desert Sunlight Solar Farm Project Final EIS and CDCA Plan Amendment 2011 – Table 3.10-1. Incorporated by reference in Section 1.11

Common Noise Descriptors

Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels (Leq) are used to develop single-value descriptions of average noise exposure over various periods. Such average noise exposure ratings often include additional weighting factors for annoyance potential due to time of day or other considerations. The Leq data used for these average noise exposure descriptors are generally based on A-weighted sound level measurements, although other weighting systems are used for special conditions (such as blasting noise).

Average noise exposure over a 24-hour period is often presented as a day-night average sound level (Ldn) or a community noise equivalent level (CNEL). Ldn values are calculated from hourly Leq values, with the Leq values for the nighttime period (10:00 p.m. to 7:00 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime noises. CNEL values are very similar to Ldn values, but include a 5 dB annoyance adjustment for evening (7:00 p.m. to 10:00 p.m.) Leq values in addition to the 10 dB adjustment for nighttime (10:00 p.m. to 7:00 a.m.) Leq values. Except in unusual situations, the CNEL descriptor will be within 1.5 dB of the Ldn descriptor for the same set of noise measurements. Unless specifically noted otherwise, Ldn and CNEL values are assumed to be based on dBA measurements.

Working with Decibel Values

Noise levels are measured on a logarithmic, decibel scale because of the physical characteristics of sound transmission and reception; noise levels diminish (or attenuate) as distance to the source increases according to the inverse square rule, where the sound energy decreases with the square of the distance. As such, individual decibel ratings for different noise sources cannot be added directly to give the decibel rating of the combination of these sources. Two noise sources producing equal dB ratings at a given location will produce a composite noise level 3 dB greater than either sound alone. When two noise sources differ by 10 dB, the composite noise level will be only 0.4 dB greater than the louder source alone. Most people have difficulty distinguishing the louder of two noise sources that differ by less than 1.5 to 2 dB. In general, a 10 dB increase in noise level is perceived as a doubling in loudness. A 2 dB increase represents a 15 percent increase in loudness, a 3 dB increase is a 23 percent increase in loudness, and a 5 dB increase is a 41 percent increase in loudness.

When distance is the only factor considered, sound levels from a ground-level stationary or point source will typically decrease by about 6 dB for every doubling of distance away from the noise source. For a noise source which is relatively long, such as a constant stream of highway traffic (line source), noise levels decrease by about 3 dB for every doubling of distance.

3.12.1 Applicable Plans, Policies, and Regulations

Various federal, state, and local agencies have developed guidelines for evaluating land use compatibility under different noise level ranges. The federal Noise Control Act of 1972 (Public Law 92-574) established a requirement that all federal agencies must administer their programs in a manner that promotes an environment free from noise that jeopardizes public health or welfare. The United States Environmental Protection Agency (USEPA) was given the responsibility for: providing information to the public regarding identifiable effects of noise on public health or welfare, publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety, coordinating federal research and activities related to noise control, and establishing federal noise emission standards for selected products distributed in interstate commerce. The federal Noise Control Act also directed all federal agencies to comply with applicable federal, State, interstate, and local noise control regulations to the same extent that any person is subject to such requirements.

Although the USEPA was given major public information and federal agency coordination roles, each federal agency retains authority to adopt noise regulations pertaining to agency programs. The USEPA can require other federal agencies to justify their noise regulations in terms of the federal Noise Control Act policy requirements, but has no authority to approve or disapprove the noise regulations and policies of other federal agencies. The Occupational Safety and Health Administration has primary authority for setting workplace noise exposure standards. Due to aviation safety considerations, the Federal Aviation Administration has primary jurisdiction over aircraft noise standards.

Federal Criteria and Standards

USEPA. In response to the requirements of the federal Noise Control Act, the USEPA (1974) recommended indoor and outdoor noise limits to protect public health and welfare (hearing damage, sleep disturbance, and communication disruption). Outdoor Ldn values of 55 dB and

indoor Ldn values of 45 dB are identified as desirable to protect against speech interference and sleep disturbance for residential, educational, and health care areas. Noise level criteria to protect against hearing damage in commercial and industrial areas are identified as 24-hour Leq values of 70 dB (both outdoors and indoors).

National Park Service. The National Park Service's (NPS) "Management Policies 2006: The Guide to Managing the National Park System" (NPS Management Policies) provides policies "intended only to improve the internal management of the National Park Service" (NPS 2006). This document includes policies on "Soundscape Management" (NPS 2006 – Section 4.9), which state that "[t]he National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks" and "will restore to the natural condition wherever possible those park soundscapes that have become degraded by unnatural sounds (noise), and will protect natural soundscapes from unacceptable impacts." The process by which the NPS will preserve includes "[u]sing appropriate management planning, superintendents will identify what levels and types of unnatural sound constitute acceptable impacts on park natural soundscapes…The Service will take action to prevent or minimize all noise that through frequency, magnitude, or duration adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified through monitoring as being acceptable to or appropriate for visitor uses at the sites being monitored."

Under Section 8.2.3, "Use of Motorized Equipment", the NPS Management Policies state that "[t]he Service will strive to preserve or restore the natural quiet and natural sounds associated with the physical and biological resources of parks. To do this, superintendents will carefully evaluate and manage how, when, and where motorized equipment is used by all who operate equipment in the parks, including park staff." The policy defines the natural ambient sound level as "the environment of sound that exists in the absence of human-caused noise—is the baseline condition, and the standard against which current conditions in a soundscape will be measured and evaluated." (NPS 2006)

State Criteria and Standards

The California Governor's Office of Planning and Research (OPR 2003) has published guidelines for the noise element of local general plans. These guidelines include a noise level/land use compatibility chart that categorizes outdoor CNEL/Ldn levels into as many as four compatibility categories (normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable), depending on land use. For many land uses, the chart shows overlapping CNEL/Ldn ranges for two or more compatibility categories.

The noise element guidelines chart identifies the normally acceptable range for low density residential uses as CNEL/Ldn values less than 60 dB, while the conditionally acceptable range is 55 to 70 dB. The normally acceptable range for high density residential uses is identified as CNEL/Ldn values below 65 dB, while the conditionally acceptable range is identified as 60 to 70 dB. For educational and medical facilities, CNEL/Ldn values below 70 dB are considered normally acceptable, while values of 60 to 70 dB are considered conditionally acceptable. For office and commercial land uses, CNEL/Ldn values below 70 dB are considered normally acceptable, while values of 67.5 to 77.5 dB are categorized as conditionally acceptable. The overlapping CNEL/Ldn ranges are intended to indicate that local conditions (existing noise levels and community attitudes toward dominant noise sources) should be considered in evaluating land use compatibility at specific locations.

Local Criteria and Standards

Cities and counties in California are required to adopt a noise element as part of their general plans. Many cities and counties have incorporated the California Department of Health Services land use compatibility guidelines as a key item in the general plan noise element, and this forms the basis for the land use compatibility guidelines adopted by Riverside County. In addition to local general plan noise elements, some cities and counties have adopted noise ordinances to legally define noise nuisances. Local noise ordinances vary considerably in their format and coverage. Many noise ordinances establish property line performance standards for different land use or zoning categories. There is considerable variation among communities as to the types of noise sources covered under local noise ordinances.

The Noise Element of the Riverside County General Plan (Riverside County 2003) identifies noise-sensitive land uses to include:

- Residential uses,
- Schools,
- Hospitals,
- Rest homes,
- Long-term care facilities,
- Mental care facilities,
- Libraries,
- Places of worship, and
- Passive recreation uses.

Riverside County has adopted the land use compatibility criteria summarized in Table 3.12-2 as part of the Noise Element of the County General Plan.

Table 3.12-2. Riverside County Land Use Compatibility Standards

	CNEL or Ldn Noise Level			
Land Use	**Normally Acceptable**	**Conditionally Acceptable**	**Normally Unacceptable**	**Clearly Unacceptable**
Low density residential (single family, duplex, mobile homes)	Up to 60 dBA	55–70 dBA	70–75 dBA	Over 75 dBA
Multiple-family residential	Up to 65 dBA	60–70 dBA	70–75 dBA	Over 75 dBA
Transient lodgings (motels and hotels)	Up to 65 dBA	60–70 dBA	70–80 dBA	Over 80 dBA
Schools, libraries, churches, hospitals, nursing homes	Up to 70 dBA	60–70 dBA	70–80 dBA	Over 80 dBA
Auditoriums, concert halls, amphitheaters	Category not used	Up to 70 dBA	Over 65 dBA	Category not used
Sports arenas, outdoor spectator sports	Category not used	Up to 75 dBA	Over 70 dBA	Category not used
Playgrounds, neighborhood parks	Up to 70 dBA	Category not used	67.5–75 dBA	Over 72.5 dBA
Golf courses, riding stables, water recreation, cemeteries	Up to 75 dBA	Category not used	70–80 dBA	Over 80 dBA
Office buildings, business commercial, professional	Up to 70 dBA	67.5–77.5 dBA	Category not used	Over 75 dBA
Industrial, manufacturing, utilities, agriculture	Up to 75 dBA	70 – 80 dBA	Category not used	Over 75 dBA

Source: Riverside County 2003 – Table N-1.

The Noise Element of the County General Plan includes numerous policies intended to minimize noise-related conflicts between adjacent types of land uses. These policies include the following:

- Discourage noise-sensitive land uses from being located in areas exposed to CNEL levels above 65 dBA;
- Guide noise-tolerant land uses into areas committed to land uses that are noise-producing, such as transportation corridors or areas adjacent to airports;
- Minimize noise spillover or encroachment from commercial and industrial land uses into adjoining residential neighborhoods or noise-sensitive areas;
- Discourage projects that cannot successfully mitigate excessive noise;
- Require commercial or industrial truck delivery hours to be limited when next to noise-sensitive land uses unless there is no feasible alternative or there are overriding transportation benefits;
- New land use development within Airport Influence Areas should comply with airport land use noise compatibility criteria contained in the applicable airport land use compatibility plan;
- Require development that generates increased traffic and subsequent increases in ambient noise level adjacent to noise-sensitive land uses to provide for appropriate mitigation measures;
- Ensure that construction activities are regulated to establish hours of operation in order to prevent or mitigate the generation of excessive or adverse noise impacts on surrounding areas;
- Require that all construction equipment utilize noise reduction features (such as mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer; and
- Consider the issue of adjacent residential land uses when designing and configuring all new non-residential development. Design and configure on-site ingress and egress points to divert traffic away from nearby noise-sensitive land uses to the greatest degree practicable.

The Noise Element of the County General Plan also identifies preferred noise standards for stationary noise sources that affect residential land uses (Table 3.12-3).

Table 3.12-3. Stationary Source Land Use Noise Standards

Land Use	Time of Day	Interior Noise Standard	Exterior Noise Standard
Residential	7:00 a.m. to 10:00 p.m.	55 dBA, 10-minute Leq	65 dBA, 10-minute Leq
Residential	10:00 p.m. to 7:00 a.m.	40 dBA, 10-minute Leq	45 dBA, 10-minute Leq

Note: The Riverside County Planning Department and Riverside County Office of Public Health have administrative discretion regarding application of these standards.
Source: Riverside County 2003 – Table N-2.

Riverside County has adopted a noise ordinance (Ordinance No. 847) to regulate noise sources on one property that may impact adjacent properties. The noise ordinance sets general noise standards according to the land use designation of the affected property. Table 3.12-4 summarizes the basic noise standards in Riverside County Ordinance No. 847, as amended.

Table 3.12-4. Noise Limits in Riverside County Noise Ordinance 847, dB Lmax

Impacted Land Use	General Plan Designations	Noise Standard 7:00 a.m. to 10:00 p.m.	Noise Standard 10:00 p.m. to 7:00 a.m.
Rural residential	RR, RM, RD	45 dBA	45 dBA
Community residential	EDR, VLDR, LDR, MDR, MHDR, HDR, VHDR, HTDR, SP (Residential)	55 dBA	45 dBA
Commercial and office	CR, CO, CT, CC, SP (Commercial)	65 dBA	55 dBA
Business park	BP	65 dBA	45 dBA
Light industrial	LI, SP (Light Industrial)	75 dBA	55 dBA
Heavy industrial	HI, SP (Heavy Industrial)	75 dBA	75 dBA
Public facility	PF	65 dBA	45 dBA
Agriculture	AG	45 dBA	45 dBA
Open space	C, CH, REC, RUR, W	45 dBA	45 dBA
Mineral resources	MR	75 dBA	45 dBA

Source: Riverside County 2007 – Table 1.

The Riverside County noise ordinance also includes special provisions related to sound amplification systems, live music, audio equipment, and power tools. The noise ordinance also provides for exceptions from the general and special noise standard provisions. In addition, the following facilities and activities are exempt from the provisions of the noise ordinance:

- Facilities owned or operated by government agencies;
- Capital improvement projects of government agencies;
- Maintenance and repair of public properties;
- Public safety personnel and their equipment in the course of conducting their official duties;
- Agricultural operations conducted on lands designated agricultural in the General Plan or on lands zoned A-1 (Light Agriculture), A-P (Light Agriculture with Poultry), A-2 (Heavy Agriculture), A-D (Agriculture-Dairy), or C/V (Citrus/Vineyard) provided those operations are carried out in a manner consistent with accepted industry standards;
- Wind energy conservation systems provided that they comply with Riverside County Ordinance No. 348;
- Private construction projects located a quarter mile or more from the nearest inhabited dwelling;
- Private construction projects located within a quarter mile of an inhabited dwelling provided that construction activities are limited to 6:00 a.m. to 6:00 p.m. during the months of June through September and are limited to 7:00 a.m. to 6:00 p.m. during the months of October through May;
- Property maintenance, including the use of mowers, leaf blowers, etc. provided that such activity is limited to the hours of 7:00 a.m. to 8:00 p.m.;
- Motor vehicles other than off-highway vehicles, but this exemption does not apply to motor vehicle sound systems; and
- The discharge of firearms in compliance with all State laws.

Vibration

Ground-borne vibrations can be a source of annoyance to people or a source of structural damage to some types of buildings. Although vibration measurements can be presented in many different forms, peak particle velocity (PPV) is the unit of measure used most often to assess building damage potential. The California Department of Transportation (Caltrans) has identified vibration impact criteria for both building damage potential and human annoyance (Caltrans 2002 and 2004). Both human annoyance effects and building damage effects depend in part on whether vibration events are isolated, discrete events or a relatively continuous episode of vibrations. In general, there is less sensitivity to single, discrete events than to continuous events or frequently repeated discrete events. Table 3.12-5 summarizes Caltrans criteria for assessing the effects of ground-borne vibration.

Table 3.12-5. Summary of Caltrans Vibration Criteria

Type of Criteria	Threshold Condition	Peak Particle Velocity, inches/second	
		Transient Sources	Continuous or Frequent Sources
Human Response	Barely perceptible	0.04	0.01
	Distinctly perceptible	0.25	0.04
	Strongly perceptible; may be annoying to some people in buildings	0.9	0.10
	Severe; unpleasant for people in buildings; unacceptable to pedestrians on bridges	2.0	0.4
Building Damage	Cosmetic damage threshold for extremely fragile historic buildings, ruins, and ancient monuments	0.12	0.08
	Cosmetic damage threshold for fragile buildings	0.2	0.1
	Cosmetic damage threshold for historic and some old buildings	0.5	0.25
	Cosmetic damage threshold for older residential structures	0.5	0.3
	Cosmetic damage threshold for newer residential structures	1.0	0.5
	Cosmetic damage threshold for modern industrial/commercial buildings	2.0	0.5

Source: Caltrans 2004 – Tables 19 and 20; Caltrans 2002 – Table 2.

The Noise Element of the Riverside County General Plan includes consideration of ground-borne vibrations. The following land uses are identified by the noise element as being vibration sensitive:

- Hospitals,
- Residential areas,
- Concert halls,
- Libraries,
- Sensitive research operations,
- Schools, and
- Offices.

Riverside County General Plan policies related to vibration include the following:

- Restrict the placement of sensitive land uses in proximity to vibration-producing land uses, and
- Prohibit the exposure of residential dwellings to ground vibration from passing trains that would be perceptible on the ground or second floors (vibrations are presumed to be perceptible if they exceed a peak particle velocity of 0.01 inch per second over a range of 1 to 100 Hz).

3.12.2 Existing Conditions

Noise

Existing noise sources near the proposed project site include local roadway traffic, off-highway recreational vehicle use, agricultural operations, aircraft overflights, private landing strips, traffic on I-10, noise from the preliminary construction of the proposed project or its alternatives, and aerodynamic noise from wind blowing through vegetation or around structures. The environmental baseline for the proposed project and alternatives includes only the preliminary construction of the Desert Sunlight Solar Farm project that had been completed as of September 2011. Ambient noise levels have not been measured in the vicinity of the proposed project; however, based on general land use conditions and the remote nature of the area, existing background noise levels would be expected to vary from 35 to 50 dBA during the daytime and to drop to 25 to 35 dBA at night. The ambient noise levels are conservative as there is ongoing construction work associated with the Desert Sunlight project which would have the potential to increase ambient noise levels. Somewhat higher noise levels would occur in proximity to I-10, along the gen-tie alternative routes. At distances of more than a few hundred feet from I-10, existing CNEL levels would be about 45 dBA.

Figure 3.12-1 in Appendix A illustrates the locations of existing noise-sensitive land uses. Locations of existing noise-sensitive land uses in the project area include homes along Kaiser Road, Beekley Road, and SR-177; homes in Eagle Mountain Village; Eagle Mountain Elementary School at Eagle Mountain Village; the Lake Tamarisk development; and homes in Desert Center. The closest occupied residence is about 6,500 feet (1.24 miles) east-southeast of the property line. A home site is located 1,320 feet (0.25 miles) from the property line of the solar facility site; however, this site is not currently in use. All other nearby homes are about 7,800 feet (1.48 miles) or farther from the project property line. JTNP encompasses the project area, and is located 1.8 miles to the northeast, 3.5 miles to the west, and over 7 miles to the north (see Figure 3.12-1 in Appendix A). Along the proposed gen-tie Alternatives B and C, the closest residence is located approximately 500 feet east of the line in the Lake Tamarisk development. For Alternative D: Cross-Valley Alignment, the closest residence is 1,450 feet southwest of the gen-tie line along Rice Road/SR-177. For Alternative E: New Cross-Valley Alignment, the closest residence is 900 feet northeast of the gen-tie line, also along Rice Road/SR-177.

Existing background noise levels near the solar facility site are expected to be low, with typical daytime noise levels of 35 to 50 dBA. Background noise levels would be higher during periods of strong winds.

Vibration

There are no identifiable sources of significant ground-borne vibrations in the project vicinity. Traffic on I-10 and SR-177 produce low levels of vibration, but those vibrations would dissipate very rapidly to imperceptible levels at the project locations, except for transmission structures within close proximity of these highways. All of the noise-sensitive land uses discussed above are also considered vibration-sensitive.

3.13 PUBLIC HEALTH AND SAFETY

This section describes existing environmental and regulatory settings associated with public health and safety as they relate to the proposed project and alternatives. The project study area includes the vicinity of the solar facility site and gen-tie line alternatives, including all areas where potential hazards introduced by construction, operation, and decommissioning of the Desert Harvest Solar Project (DHSP) could affect public health and safety.

3.13.1 Applicable Plans, Policies, and Regulations

The following section provides a summary of the federal, state, and local regulatory framework and the laws, regulations, and standards that govern hazards, health and safety in the DHSP area.

Federal

Hazardous Materials Transportation Act (49 USC § 5101 et seq.)

The U.S. Department of Transportation has regulatory authority for the safe transportation of hazardous materials under the Hazardous Materials Transportation Act, as amended and codified in 49 United States Code (USC) 5101 et seq. Vehicles transporting hazardous materials must comply with strict containment, safety, labeling and manifesting requirements.

Resource Conservation and Recovery Act (42 USC. § 6901 et seq.)

The Resource Conservation and Recovery Act (RCRA) of 1976 establishes a program administered by the U.S. Environmental Protection Agency (USEPA) for the regulation of the generation, transportation, treatment, storage and disposal of hazardous waste. RCRA was amended in 1984 by the Hazardous and Solid Waste Act, which affirmed and extended the "cradle to grave" system of regulating hazardous waste. The use of certain techniques for the disposal of some hazardous wastes was specifically prohibited by the Hazardous and Solid Waste Act. RCRA regulates hazardous waste from the time that the waste is generated, through to its management, storage, transport, and treatment until its final disposal. In California, the EPA has authorized the Department of Toxic Substance Control (DTSC) to administer the RCRA program, pursuant to the State's Hazardous Waste Control Law.

Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) of 1980 (42 USC. § 9601 et seq.)

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) provides a federal Superfund to clean up uncontrolled or abandoned hazardous waste sites as well as accidents, spills and other emergency releases of pollutants and contaminants into the environment. The USEPA administers CERCLA. This law provides broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Superfund Amendments and Reauthorization Act of 1986 (Title III 40 CFR§ 68.110 et seq.)

The Superfund Amendments and Reauthorization Act amended CERCLA and established a nationwide emergency planning and response program, and imposed reporting requirements for businesses that store, handle or produce significant quantities of extremely hazardous materials. Administered by the USEPA, the act requires states to implement a comprehensive system to

inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. Additionally, the Superfund Amendments and Reauthorization Act identifies requirements for planning, reporting, and notification concerning hazardous materials.

Oil Pollution Prevention (40 CFR Part 112)

The goal of the oil pollution prevention regulation in 40 Code of Federal Regulations Part 112 is to prevent oil discharges from reaching navigable waters of the United States or adjoining shorelines. Facilities that could reasonably be expected to discharge oil into navigable waters in quantities that may be harmful are required to develop and implement Spill Prevention, Control and Countermeasures (SPCC) plans per the SPCC rule.

Occupational Safety and Health Administration

The Occupational Safety and Health Administration administers health standards that (1) provide regulations for safety in the workplace; (2) regulate construction safety; and (3) require a Hazards Communication Plan. The plan includes identification and inventory of all hazardous materials for which Material Safety Data Sheets would be maintained, and employee training in safe handling of said materials.

State of California

California Environmental Protection Agency

The California Environmental Protection Agency (Cal EPA) unifies California's environmental authority, consolidating the California Air Resources Board (CARB), State Water Resources Control Board (SWRCB), Regional Water Quality Control Board (RWQCB), Integrated Waste Management Board, the DTSC, Office of Environmental Health Hazard Assessment, and the Department of Pesticide Regulation under one agency. The California Hazardous Waste Control Law is administered by Cal EPA's DTSC.

Department of Toxic Substance Control

The DTSC is the primary agency in California that regulates hazardous waste, administers cleanups of existing contamination, and looks for ways to reduce hazardous waste produced in California. The DTSC regulates hazardous waste in California primarily under the authority of RCRA and the California Health and Safety Code. The DTSC manages, maintains and monitors the Cortese list of hazardous waste sites. The Cortese list, or Hazardous Waste and Substances Sites List, is a planning resource used by the state, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites.

California Emergency Management Agency

The California Emergency Management Agency was formed January 1, 2009 as a result of a merger between the Governor's Office of Emergency Services and the Office of Homeland Security. The Hazardous Materials Unit of the California Emergency Management Agency is responsible for hazardous materials emergency planning and response, spill release notifications, and hazardous materials enforcement of the Unified Program. The Office of Emergency Services provides emergency response services in support of local jurisdictions.

Riverside County

County of Riverside Department of Environmental Health

The County of Riverside Department of Environmental Health (DEH) acts as the Certified Unified Program Agency (CUPA) for Riverside County and is responsible for reviewing Hazardous Materials Business Plans. A CUPA is a local agency that has been certified by Cal EPA to implement state environmental programs related to hazardous materials and waste. The DEH is responsible for protecting the health and safety of the public and the environment of Riverside County by assuring that hazardous materials are properly handled and stored. The DEH accomplishes this through inspection, emergency response, site remediation and hazardous waste management services. The specific responsibilities of the DEH include the following:

- Inspecting hazardous material handlers and hazardous waste generators to ensure full compliance with laws and regulations.
- Implementing CUPA programs for the development of accident prevention and emergency plans, proper installation, monitoring, and closure of underground storage tanks and the handling, storage and transportation and disposal of hazardous wastes.
- Providing 24-hour response to emergency incidents involving hazardous materials or wastes in order to protect the public and the environment from accidental releases and illegal activities.
- Overseeing the investigation and remediation of environmental contamination due to releases from underground storage tanks, hazardous waste containers, chemical processes or the transportation of hazardous materials.

Conducting investigations and taking enforcement action as necessary against anyone who disposes of hazardous waste illegally or otherwise manages hazardous materials or wastes in violation of federal, state or local laws and regulations.

3.13.2 Existing Conditions

This section contains a description of the environmental setting for the proposed project and alternatives with respect to hazardous materials and public health and safety issues that may exist in the project area. The setting for hazardous wastes is described in Section 3.21. The following issues are addressed in this section: existing hazardous materials/hazardous waste in the area, proximity to airports and schools, emergency evacuation routes, emergency response plans, intentionally destructive acts, and electromagnetic fields (EMF).

The DHSP is proposed in an area that has a variety of uses including open space recreation and preserve, residential housing, and commercial businesses. There are no hazardous materials generators or hazardous waste generators within the areas where the proposed project or alternatives would be located.

Existing Hazardous Materials/Waste

Existing and past land use activities are potential indicators of hazardous materials and hazardous waste storage and use. The primary reasons to define potentially hazardous sites are to protect the health and safety of construction and operations personnel and to minimize public exposure to hazardous materials during construction and waste handling.

The following is a summary definition of hazardous materials and hazardous waste.

- Hazardous Material: Any material that due to its quantity, concentration or physical characteristics poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or environment.
- Hazardous Waste: A waste or combination of wastes, which due to its quantity, concentration or physical, chemical, or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating but reversible illness; or pose a substantial present or potential hazard to human health or the environment due to factors including, but not limited to carcinogenicity, acute toxicity, chronic toxicity, bioaccumulative properties or persistence in the environment when improperly treated, stored, transported, or disposed of or otherwise managed.

Database Review

A hazardous materials storage and contaminated sites database search was conducted for the project study area in 2010 as a part of the EIS for the Desert Sunlight Solar Farm (DSSF) project, located immediately adjacent to the DHSP and within the proposed project study area (BLM 2011; incorporated by reference in Section 1.11). According to the records search, seven entries were recorded on the Emergency Response Notification Systems list for spills near to the proposed project and its alternatives. These spills were identified along I-10. None of these spills were identified as needing additional remediation after initial cleanup activities.

Two additional sites were identified as permitted facilities. A sanitary landfill, listed as the Desert Center Sanitary site (17-991 Kaiser Road), was listed as a permitted Solid Waste Landfill site that accepts agricultural, construction/demolition and mixed municipal waste by the County of Riverside Waste Management Department. The second permitted site is the Iron Mountain pumping station (6001 Iron Mountain Pumping Plant Road), which is also listed as a RCRA waste generator. An underground storage tank (UST) has also been associated with the Eagle Mountain pumping station. No violations or environmental actions for these sites were listed. One final site, the Eagle Mountain Mine, was listed as No Further Remedial Action Planned. No violations or environmental actions for this site were listed.

A number of listings in the area were listed as registered underground storage tanks (UST). No violations or environmental actions for these sites were identified. Two sites, also identified as UST sites, were listed on the Leaking Underground Storage Tank (LUST) list. The Caltrans Desert Center site (44740 Ragsdale Road) and the Metropolitan Water District Eagle Mountain Pumping Station (Eagle Mountain Road) were both listed as site closures with a no further action letter. No additional environmental actions were identified for either site.

Other Hazardous Waste Issues

A Phase I Environmental Site Assessment conducted for the adjacent DSSF project indicated that the DHSP project study area was possibly used historically as a military training facility and that there is some potential for munitions and explosives of concern to be present on site. Specifically a topographic map from 1947 indicated that the gen-tie line Alternative D traverses the southwest corner of a military reservation boundary (BLM 2011).

Airports

The former Desert Center Airport is located 2.7 miles southeast from the proposed solar facility boundary and less than a mile from gen-tie line Alternatives D and E. This airport is no longer in regular use but the site has been developed into a multi-use recreational facility, the Chuckwalla Valley Raceway, including an automotive race track facility with accessory buildings, dry (without utility hook-ups) on-site camping, and associated amenities. The redevelopment includes use of the runway as a private special-use airport (County of Riverside Redevelopment Agency 2009). There is also a private landing strip associated with the closed Eagle Mountain mine that is Redevelopment Agency 2009). There is also a private landing strip associated with the closed Eagle Mountain mine that is located 6.4 miles northwest of the proposed project site. This private airstrip is minimally used to access the closed Eagle Mountain mine.

Schools and Other Sensitive Receptors

There is one school in the vicinity of the solar facility site. Eagle Mountain Elementary School is located 5.3 miles from the northwestern boundary of the solar facility site. It supports kindergarten through eighth grade students. Eagle Mountain Elementary School is part of the Desert Center Unified School District.

A number of scattered rural residences occur in the project study area. Locations of sensitive residential receptors include homes along Kaiser Road, Beekley Road, and SR-177; homes in Eagle Mountain Village; the Lake Tamarisk development; and homes in Desert Center. The closest occupied residence is about 6,500 feet (1.24 miles) east-southeast of the property line. A home site is located 1,320 feet (0.25 miles) from the property line of the solar facility site; however, this residence is not currently in use and the house is unsuitable for occupation. All other nearby homes are about 7,800 feet (1.48 miles) or farther from the solar facility property line (see Figure 3.12-1 in Appendix A). Along gen-tie line Alternatives B and C, the closest residence is located approximately 500 feet east of the line in the Lake Tamarisk development. For Alternative D: Cross-Valley Alignment, the closest residence is 1,450 feet southwest of the gen-tie line along Rice Road/SR-177. For Alternative E: New Cross-Valley Alignment, the closest residence is 900 feet northeast of the gen-tie line, also along Rice Road/SR-177. Figure 3.12-1 in Appendix A illustrates the locations of noise-sensitive land uses.

Emergency Evacuation Routes

Emergency evacuation routes in the Desert Center region are I-10 and SR-177 (Rice Road). Further discussion of transportation routes is provided in Section 3.21.

Emergency Response Plan

The County of Riverside DEH acts as the CUPA for Riverside County. The CUPA program is designed to consolidate, coordinate, and administer permits, inspection activities, and enforcement activities throughout the County of Riverside. The programs administered by the CUPA are as follows:

- Business Emergency Plan/Hazardous Materials Handler;
- Hazardous Waste Generators;
- Underground Storage Tanks;

- California Accidental Release Program;
- Aboveground Petroleum Storage Act/SPCC Plan; and
- Uniform Fire Code Hazardous Materials Management Plans.

The Applicant and SCE will be required to complete emergency response plans as identified by the DEH as relevant to the construction and operation of the DHSP.

Electromagnetic Fields

EMF is a term used to describe electric and magnetic fields that are created by electric voltage (electric field) and electric current (magnetic field). Electromagnetic fields can be viewed as a combination of both an electric and magnetic field that can be regarded as a smooth, continuous field, propagating in a wavelike manner. Power frequency EMF is a natural consequence of electrical currents, and can be either directly measured using the appropriate measuring instruments or calculated using appropriate information.

Electric fields are present whenever voltage exists on a wire, and are not dependent on current. The magnitude of the electric field is primarily a function of the configuration and operation voltage of the line and decreases with the distance from the source. The electric field can be shielded (i.e., the strength can be reduced) by any conducting surface, such as trees, fences, walls, buildings, and most types of structures. The strength of an electric field is measured in volts per meter (V/m) or kilovolts per meter (kV/m). Typical electric field values for appliances are presented in Table 3.13-1.

Table 3.13-1. Typical Electric Field Values for Appliances, at 12 Inches

Appliance	Electric Field Strength (V/m)
Stereo Receiver	180
Iron	120
Refrigerator	120
Mixer	100
Toaster	80
Hair Dryer	80
Color TV	60
Coffee Machine	60
Vacuum Cleaner	50
Electric Oven	8
Light Bulb	5

Source: WHO 2011
* 1 to 10 kV/m next to blanket wires.
kV/m: Kilovolts/meter

Magnetic fields are present whenever current flows in a conductor, and are not dependent on voltage of the conductor. The strength of these fields also decreases with distance from the source. However, unlike electric fields, most common materials have little shielding effect on magnetic fields. Magnetic field strength is a function of both the current on the conductor and the design of the system. Magnetic fields are measured in units called Gauss. However, for low

levels normally encountered near electric utility facilities, the field strength is expressed in a much smaller unit, the milliGauss (mG), which is one thousandth of a Gauss.

Power frequency EMF is present whenever electricity is used. This includes not only electric power generation, utility transmission lines, distribution lines and on-site and off-site substations as proposed with the DHSP, but also the building wiring in homes, offices, schools and in the appliances and machinery used in these locations. Magnetic field intensities from these sources can range from below 1 mG to above 1,000 mG (1 Gauss).

Magnetic field levels from household appliances at several different distances are presented in Table 3.13-2.

Table 3.13-2. Magnetic Field from Household Appliances

	Magnetic Field (mG) at Distance of:		
Appliance	1.18 inches (3 cm)	11.81 inches (30 cm)	39.37 inches (1 m)
Hair dryer	60–20000	0.1–70	0.1–0.3
Electric shaver	150–15000	0.8–9	0.1–0.3
Vacuum cleaner	2000–8000	20–200	1.3–20
Fluorescent light	400–4000	5–20	0.2–2.5
Microwave oven	730–2000	40–80	2.5–6
Portable radio	160–560	10	< 0.1
Electric oven	10–500	1.5–5	0.1–0.4
Washing machine	8–500	1.5–30	0.1–1.5
Iron	80–300	1.2–3	0.1–0.3
Dishwasher	35–200	6–30	0.7–3
Computer	5–300	< 0.1	—
Refrigerator	5–17	0.1–2.5	< 0.1
Color TV	25–500	0.4–20	0.1–1.5

Source: WHO 2011.

As shown in Table 3.13-2, magnetic field strength diminishes with distance. Fields from compact sources (i.e., those containing coils such as small appliances and transformers) drop off with distance (r) from the source by a factor of $1/r^3$. For three-phase power lines with balanced currents, the magnetic field strength drops off at a rate of $1/r^2$. Fields from unbalanced currents, which flow in paths such as neutral or ground conductors, fall off inversely proportional to the distance from the source or 1/r. Conductor spacing and configuration also affect the rate at which the magnetic field strength decreases, as well as the presence of other sources of electricity.

EMF levels can be reduced in three primary ways: shielding, field cancellation or increasing the distance from the source. Shielding, which primarily reduces exposure to electric fields, can be actively accomplished by placing trees or other physical barriers adjacent to the EMF generating structure. Since electric fields can be blocked by most materials, shielding is effective for the electric fields but of limited effectiveness for magnetic fields.

Magnetic fields can be reduced by either cancellation or by increasing distance from the field. Cancellation is achieved in two ways. A transmission line circuit consists of three "phases":

three separate wires (conductors) on a transmission tower. The configuration of these three conductors can reduce magnetic fields. When the configuration places the three conductors closer together, the interference or cancellation of the fields from each wire is enhanced. This technique has practical limitations because of the potential for short circuits if the wires are placed too close together. There are also worker safety issues to consider if spacing is reduced. In instances where there are two circuits (more than three phase wires), cancellation can be accomplished by arranging phase wires from different circuits near each other. The distance between the source of fields and the public can be increased by either placing the wires higher above ground, burying underground cables deeper, or by increasing the right-of-way. These methods can prove effective in reducing fields because the field strength drops rapidly with distance.

Regulation of EMFs

Because there are no state or federal guidelines or regulations related to electromagnetic fields, the state policy developed by the California Public Utilities Commission (CPUC) is summarized here (CPUC 2006). The CPUC has jurisdiction over investor-owned utilities, but not over solar generation projects or privately owned gen-tie lines.

On January 15, 1991, the CPUC initiated an investigation to consider its role in mitigating the health effects, if any, of EMF from electric utility facilities and power lines. A working group of interested parties, called the California Electromagnetic Frequency Consensus Group, was created by the CPUC to advise it on this issue. The group consisted of stakeholders representing citizens groups, consumer groups, environmental groups, stakeholder agencies, unions and utilities. Based on the work of the Consensus Group, written testimony and evidentiary hearings, the CPUC issued its decision (93-11-013) on November 2, 1993, to address public concerns about possible EMF health effects from electric utility facilities.

In response to a situation of scientific uncertainty and public concerns, the decision specifically required the investor-owned utilities to consider "no-cost" and "low-cost" measures, where feasible, to reduce exposure from new or upgraded utility facilities requiring certification under General Order 131-D. It directs that no-cost mitigation measures be undertaken, and that low-cost options, when they meet certain guidelines for field reduction and cost, are adopted through the project certification process. The decision directed the investor-owned utilities to use a 4 percent benchmark on the low-cost mitigation. These reduction measures would be documented in a project-specific Field Management Plan. The CPUC did not adopt any specific numerical limits or regulations on EMF levels related to electric power facilities.

In Decision D.93 11 013, the CPUC addressed mitigation of EMF of utility facilities and implemented the following recommendations for investor-owned utilities:

- No-cost and low-cost steps to reduce EMF levels;
- Workshops to develop EMF design guidelines;
- Uniform residential and workplace programs;
- Stakeholder and public involvement;
- A four-year education program;
- A four-year nonexperimental and administrative research program; and
- An authorization of federal experimental research conducted under the National Energy Policy Act of 1992.

Most recently the CPUC issued Decision D.06 01 042, on January 26, 2006, affirming the low-cost/no-cost policy to mitigate EMF frequency exposure from new utility transmission and sub-station projects. This decision also adopted rules and policies to improve utility design guidelines for reducing EMF. The CPUC stated: "At this time we are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences."

The CPUC has not implemented a general requirement that utilities include nonroutine mitigation measures or other mitigation measures that are based on numeric values of EMF exposure and has not adopted any specific limits or regulation on EMF related to electric power facilities. Mitigation measures may be determined for utility projects on a project-by-project basis by the CPUC.

Other Concerns Related to Electric and Magnetic Fields

Additional concerns regarding EMF related to power line fields include radio, television, electronic equipment interference, induced currents and shock hazards, and effects on cardiac pacemakers. Each of these issues is described below.

Radio/Television/Electronic Equipment Interference

Although corona can generate high frequency energy that may interfere with broadcast signals or electronic equipment, this is generally not a problem for transmission lines. Corona is a process by which a current, perhaps sustained, develops from an electrode with a high potential in a neutral fluid, usually air, by ionizing that fluid to create a plasma around the electrode.

Gap discharges or arcs can also be a source of high frequency energy. Gap discharges occur when an arc forms across a gap in loose or worn line hardware. It is estimated that over 90 percent of interference problems for electric transmission lines are due to gap discharges. Line hardware is designed to be problem-free, but wind motion, corrosion, and other factors can create a gap discharge condition. When identified, gap discharges can be located and remedied by utilities.

Electric fields from power lines do not typically pose interference problems for electronic equipment in businesses since the equipment is shielded by buildings and walls. However, magnetic fields can penetrate buildings and walls, thereby interacting with electronic equipment. Depending on the sensitivity of equipment, the magnetic fields can interfere with operation. Review of this phenomenon in regard to the sensitivity of electrical equipment identifies a number of thresholds for magnetic field interference. Interference with typical computer monitors can be detected at magnetic field levels of 10 mG and above, while large screen or high-resolution monitors can be susceptible to interference at levels as low as 5 mG.

Other specialized equipment, such as medical or testing equipment, can be sensitive at levels below 5 mG. Equipment that may be susceptible to very low magnetic field strengths is typically installed in specialized and controlled environments, since even building wiring, lights, and other equipment can generate magnetic fields of 5 mG or higher.

The most common electronic equipment that can be susceptible to magnetic field interference is probably computer monitors. Magnetic field interference results in disturbances to the image displayed on the monitor, often described as screen distortion, "jitter," or other visual defects. In most cases it is annoying, and at its worst, it can prevent use of the monitor. This type of inter-

ference is a recognized problem in the video monitor industry. As a result, there are manufacturers who specialize in monitor interference solutions and shielding equipment. Possible solutions to this problem include relocating the monitor, using magnetic shield enclosures, installing software programs, and replacing cathode ray tube monitors with liquid crystal displays that are not susceptible to magnetic field interference.

Induced Currents and Shock Hazards

Power line fields can induce voltages and currents on conductive objects, such as metal roofs or buildings, fences, and vehicles. When a person or animal comes in contact with a conductive object, a perceptible current or small secondary shock may occur. Secondary shocks cause no physiological harm, but they may present a nuisance.

Cardiac Pacemakers

An area of concern related to electric fields from transmission lines has been the possibility of interference with cardiac pacemakers. There are two general types of pacemakers: asynchronous and synchronous. The asynchronous pacemaker pulses at a predetermined rate. It is generally immune to interference because it has no sensing circuitry and is not exceptionally complex. The synchronous pacemaker, however, pulses only when its sensing circuitry determines that pacing is necessary. Interference from transmission line electric field may cause a spurious signal on the pacemaker's sensing circuitry. However, when these pacemakers detect a spurious signal, such as a 60 Hertz (Hz) signal, they are programmed to revert to an asynchronous or fixed pacing mode of operation, returning to synchronous operation within a specified time after the signal is no longer detected. Cardiovascular specialists do not consider prolonged asynchronous pacing a problem, since some pacemakers are designed to operate that way. Periods of operation in this mode are commonly induced by cardiologists to check pacemaker performance. So, while transmission line electric fields may interfere with the normal operation of some of the older model pacemakers, the result of the interference is generally not harmful and is of short duration (Illinois Institute of Technology Research Institute 1979; University of Rochester 1985).

EMF Associated with the DHSP Location

The project study area has minimal rural residential development. The nearest residences to the proposed project site and the gen-tie line alternatives are shown in Figure 3.12-1 in Appendix A. In undeveloped and natural areas, measurable EMFs are not present except in the vicinity of existing power lines. Public exposure to EMF in undeveloped areas is limited, primarily due to the absence of receptors (people).

There are currently several sources of EMF within the project study area, including a 161-kV and 230-kV Metropolitan Water District transmission line and a 33-kV Kaiser Ventures power line. The 161-kV transmission line bisects the proposed solar facility.

3.14 RECREATION

This section describes the existing recreational uses that could be affected by the implementation of proposed project and alternatives. The project study area for recreation encompasses all areas in the vicinity of the proposed project and alternatives that could be affected by construction, operation, and decommissioning of the Desert Harvest Solar Project (DHSP); this includes recreational areas from which the project would be visible. The environmental baseline for the DHSP includes the preliminary construction of the Desert Sunlight Solar Farm project (all construction that was complete up to and including September 2011).

3.14.1 Applicable Plans, Policies, and Regulations

The following federal, state, and local laws and policies apply to the administration of recreation within the project study area.

Wilderness Act of 1964

The Wilderness Act, signed into law in 1964, created the National Wilderness Preservation System and recognized wilderness as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." The Act further defined wilderness as "an area of undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions. . . ."

Designated wilderness is the highest level of conservation protection for federal lands. Only Congress may designate wilderness or change the status of wilderness areas. Wilderness areas are designated within existing federal public land. Congress has directed four federal land management agencies — U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service, and National Park Service — to manage wilderness areas so as to preserve and, where possible, to restore their wilderness character.

The Wilderness Act prohibits permanent roads and commercial enterprises, except commercial services that may provide for recreational or other purposes of the Wilderness Act. Wilderness areas generally do not allow motorized equipment, motor vehicles, mechanical transport, temporary roads, permanent structures or installations (with exceptions in Alaska). Wilderness areas are to be primarily affected by the forces of nature, though the Wilderness Act does acknowledge the need to provide for human health and safety, protect private property, control insect infestations, and fight fires within the area. Wilderness areas are managed under the direction of the Wilderness Act, subsequent legislation (such as the Alaska National Interest Lands Conservation Act), and agency policy. The Joshua Tree Wilderness Area occurs along the border of JTNP closest to the proposed project and alternatives, approximately 2 miles northeast of the northeastern boundary of the proposed solar facility, see Figure 2-1. The BLM Palen/McCoy Wilderness is located approximately 10 miles east of the proposed solar facility.

Federal Land Policy and Management Act (FLPMA)

FLPMA recognizes the value of public lands and includes the multiple use/sustained yield framework for management to provide for outdoor recreation for future generations (BLM 2001). Title VI of FLPMA, *Designated Management Areas, California Desert Conservation Area*, acknowledges the recreational resources contained within the California desert environment and

directs the BLM to develop a multiple use and sustained yield management plan to conserve the desert's resources, particularly recreational use. The solar facility site is governed by these pieces of legislation, and its various alternatives would impact the recreational opportunities available in the vicinity.

California Desert Conservation Area (CDCA) Plan

The CDCA Plan defines Multiple-Use Classes for all BLM-managed lands, which includes the lands within the project study area. The CDCA Plan establishes goals for management of recreation in the California Desert (BLM 1980). As with the FLPMA, recreational opportunities in the project study area are framed by the CDCA Plan. The goals are to provide for the use of the public lands and resources of the CDCA, including recreational uses, in a manner that enhances wherever possible — and that does not diminish — the environmental, cultural, and aesthetic values of the desert (BLM 1980). The goals of the Recreation Element of the plan are to:

- Provide for a wide range of quality recreation opportunities and experiences emphasizing dispersed undeveloped use;
- Provide a minimum of recreation facilities. Those facilities should emphasize resource protection and visitor safety;
- Manage recreation use to minimize user conflicts, provide a safe recreation environment, and protect desert resources;
- Emphasize the use of public information and education techniques to increase public awareness, enjoyment, and sensitivity to desert resources;
- Adjust management approach to accommodate changing visitor use patterns and preferences; and
- Encourage the use and enjoyment of desert recreation opportunities by special populations, and provide facilities to meet the needs of those groups.

Areas of Critical Environmental Concern (ACECs) are also identified as special management areas in the CDCA Plan. These include areas where special management attention is required to protect important historic, cultural, scenic, biological, or other natural resources. The Desert Lily ACEC is located 2.4 miles southeast of the site for all of the solar facility alternatives and 0.5 mile north of a portion of gen-tie Alternative E. The Alligator Rock ACEC is located south of Desert Center and within one mile of a portion of gen-tie Alternatives B and C.

The CDCA Plan also contains a motorized-vehicle access element, which provides a system and a set of rules that governs access to the CDCA by motor vehicles. The rules include providing for constrained motor-vehicle access, while protecting desert resources (BLM 1980). When the CDCA Plan was first adopted, the BLM designated a network of motorized vehicle routes on public lands within the northern and eastern Mojave Desert. The BLM designated routes for north-central and southern portions of the CDCA. The BLM manages OHV use, so the conditions of special status species and other natural and cultural resources are maintained (BLM 2011). There are no designated OHV routes in the solar facility area or gen-tie alternative routes.

Northern and Eastern Colorado Desert Coordinated Management Plan

The NECO Plan, an amendment to the CDCA Plan, provides for management of recreation within the California Desert area of El Centro, Blythe, Needles, and cities in the Coachella Valley, including the project study area (BLM 2011). The NECO Plan specifies the types of recreational activities allowed in Multiple-Use Classes on BLM-administered land. Under this plan, new routes may be allowed if approved by the authorized officer. All competitive and organized events having 50 or more vehicles require permits. The plan includes an off-highway vehicles (OHV) route inventory and is the current authority on OHV routes. There are no designated OHV routes in the solar facility area or gen-tie alternative routes.

Off-Road Vehicles (Title 43 CFR 8340, et seq.)

This regulation establishes criteria for designating public lands as open, limited, or closed to the use of OHVs and for establishing controls governing the use and operation of OHVs in such areas, while protecting resources, promoting safety, and minimizing user conflicts. Recreational use under Title VI "includes the use, where appropriate, of off-road recreational vehicles" (BLM 2001).

Riverside County Integrated Plan, General Plan, and Desert Center Area Plan

The Riverside County General Plan includes policy area locations, such as for Desert Center, that have a separate Land Use Plan for future development and growth. The entire project study area falls within the DCAP, which is part of the General Plan. Local land use does not apply to the BLM, but the FLPMA requires the BLM to coordinate with local governments in land use planning in Title II, Section 202, (b)(9).

Additional land use policies are described in more detail in Section 3.11, Lands and Realty.

3.14.2 Existing Conditions

Recreation Management Areas. The solar facility site and most of the length of the gen-tie alternatives occur on BLM-administered land. The portions of the proposed project and alternatives on BLM-administered land are managed as default Extensive Recreation Management Areas (ERMA). The BLM does not have recreation facilities, trails, or other improvements in the project study area and does not have traffic counters or other means of estimating use. ERMAs normally experience light to moderate dispersed recreation use, including camping, hiking, hunting, and OHV use. The proposed location of the DHSP includes land that is mostly classified as Multiple-Use Class M (Moderate Use) and some as Multiple-Use Class L (Limited Use). Multiple-Use Class M lands are controlled by a balance between higher intensity recreation use and protection of public lands. These lands are managed to provide a variety of uses, including mining, grazing, recreation, utilities, and energy development. Multiple-Use Class L lands are managed to provide for generally lower intensity, carefully controlled, multiple use of resources (BLM 2011), but can include developments like the Proposed Action. Open OHV areas permit driving or riding off designated routes; there are no BLM-designated open OHV areas in the project study area.

OHV Management/Designations. OHV use is allowed only on BLM-managed lands along designated routes that are open to travel or off of designated routes within open OHV areas per the NECO Plan Amendment to the CDCA Plan. Three open routes designated by the NECO

plan (660537, 660332, and 660533) intersect the solar facility site and would result in a maximum of approximately 5.7 miles of trail closures in the area. There are no open OHV areas in Riverside County where riding off of designated routes is permitted.

Other Roads

Several smaller unpaved and unmaintained local roads or routes have been documented in the project study area and are shown on Figure 3.14-1 in Appendix A.

Developed Recreation Sites. The Desert Center Airport, southwest of the proposed solar facility, was previously owned and operated by Riverside County but is now privately owned. The airport consists of one paved 4,200-foot-long, 50–foot-wide runway, a pilot lounge, storage building, beacon tower, and hangar (BLM 2011). The airport has been redeveloped for use as a private, members-only automotive racetrack, with spaces for recreational vehicles (no utility hook-ups) (BLM 2011).

Lake Tamarisk Resort is approximately 2 miles south of the solar facility site and adjacent to a portion of Alternatives B and C. This member-owned resort has 60 members and 150 mobile home spaces, mobile home rentals, camping spaces, a heated pool, a clubhouse, and a nine-hole public golf course.

Dispersed Recreation. Although not within the proposed solar facility footprint or intersected by gen-tie alternatives, the Desert Lily Area of Critical Environmental Concern (ACEC) is a recreation attraction in the project study area. This ACEC covers 2,031 acres and was established to protect botanical values, in particular, the desert lily (*Hesperocallis undulata*). This area is withdrawn from all forms of appropriation including mineral entry, and is bound on the western edge by a fence bordering Highway 177. It is 2.4 miles southeast of the solar facility site and 0.5 miles north of a portion of the gen-tie Alternative E. This ACEC is used by a few hundred visitors per year; it includes a car and RV camping area, and supports various recreation activities, such as photography and nature studies.

The Alligator Rock ACEC is also outside of the proposed solar facility site. The Alligator Rock ACEC is a 7,726 acres area that was dedicated as an ACEC for archaeological values. The ACEC is located 0.4 miles south of gen-tie line Alternatives B and C and 0.7 miles west of gen-tie line Alternatives D and E, on the west side of the Red Bluff Substation.

JTNP surrounds the northern portion of the project study area. The Joshua Tree Wilderness Area (discussed in Section 3.17 – Special Designations) is on the southern tip of the Coxcomb Mountains; this is less than 2 miles to the east of the DHSP at its closest point (Figure 2-1). The Joshua Tree Wilderness Area is composed of arroyos, playas, bajadas, narrow ravines, and steep mountains. Some visitors are likely to use this area for recreation because of its proximity to Highway 177, though in general, because of the steep terrain and lack of trails, much of the park in this area is difficult to access. As a result, most of the recreation use closest to the proposed project and alternatives is highly dispersed, with visitors seeking opportunities for day hiking, backpacking, and other forms of non-motorized recreation. Nonetheless, Wilderness values, including "solitude or a primitive and unconfined type of recreation," as well as “ecological, geological, or other features of scientific, educational, scenic, or historical value" as defined by the Wilderness Act are protected in Joshua Tree Wilderness. In addition, a 2010 JTNP visitor survey revealed that the most important attributes/resources to visitor groups in the Park as a

whole were (1) Views without development, (2) Clean air, (3) Natural quiet/sounds of nature, (4) Desert plants/wildflowers, (5) Native wildlife, (6) Access to rock formations, (7) Solitude, (8) Dark, starry night skies, and (9) Access to historical/cultural sites (Jette et al. 2011).

Motorized vehicles must stay on established roads within the Park. Aerial photography and the Park Service's visitor brochure reveal no significant trails, routes, or other park improvements within 8 miles of the solar facility boundary. Visitor studies were completed in spring 2004 and winter 2010 (Jette et al. 2011), but specific data are not available for visitor use and visitor preferences for dispersed recreation areas near the solar facility.

Chuckwalla Mountains and Palen-McCoy Wilderness Areas, administered by the BLM, are located 7 miles south and 10 miles east of the project study area. Both are discussed in Section 3.17-Special Designations; the DHSP would be visible from these areas.

The Edmund C. Jaeger Nature Sanctuary is also near the solar facility area, about 9 miles south of the DHSP site. In addition, Corn Springs Campground is about 20 miles south of the DHSP (south of I-10, surrounded by the Chuckwalla Mountains Wilderness); this campground averages 300 visitors a year (BLM 2011). The developed Wiley's Well and Coon Hollow Campgrounds are within the Mule Mountain Long Term Visitor Area (LTVA), located about 35 miles southeast of the solar facility site, and Midland LTVA is 45 miles east from the DHSP site (BLM 2011). LTVAs are long-term permit areas where "snow birds" can stay all winter in self-contained recreational vehicles (normally camping is limited to 14 days on public land). There are no facilities or services, except for a volunteer host, information kiosk, and vault toilet (no water). Each LTVA averages about 52 long-term visitors a year (BLM 2011). Chiriaco Summit, the location of the General Patton Museum, is 19 miles west of Desert Center, on BLM land (BLM 2011).

General Project Study Area Recreation Use. There is minimal recreation in close proximity to the solar facility site; however, some recreational uses have been observed by BLM staff and ranger patrols. The most common type of recreation is driving for pleasure or sightseeing, in both street legal vehicles and OHVs on approved routes. Car or RV camping may occur, but it has not been observed by BLM staff and is not considered a popular use. Day use of the area is most common, mostly by residents of Desert Center or off-duty workers from facilities around Eagle Mountain. Some hiking, photography, target shooting, and limited hunting is assumed to occur in the general area, but not on the solar facility site. Though the solar facility is near JTNP, access to the park and wilderness from this area is not common and has not been observed by BLM staff.

3.15 SOCIAL AND ECONOMIC SETTING

This section provides an overview of the applicable plans, policies, regulations and existing conditions, historic trends, and relevant projections for population and housing, employment and income, and public services and utilities that could be affected by implementation of the proposed project and alternatives. The project study area for social and economic resources encompasses local communities and unincorporated Riverside County in and around the proposed Desert Harvest Solar Project (DHSP). Data are provided for Riverside County, for local communities where applicable and available, and for California for comparison.

3.15.1 Applicable Plans, Policies, and Regulations

Federal

Applicable plans, policies, and regulations for socioeconomics include the National Environmental Protection Act (NEPA) (42 United States Code [USC] 4321 et seq.). NEPA requires an analysis of the Proposed Action's economic, social, and demographic effects related to effects on the natural or physical environment in the affected area, but does not require economic, social, and demographic effects to be analyzed in isolation from the physical environment.

State

California state regulations regarding socioeconomics (including the provision of public services and utilities) that apply to the proposed project include Title 14 of the California Code of Regulations, Chapter 3, Guidelines for Implementation of the California Environmental Quality Act (CEQA), Article 9(a), Section 15131; California Education Code, Section 17620; California Government Code, Sections 65996–65997; and California Revenue and Taxation Code, sections 721–725: California Board of Equalization (BOE) – Property Tax Rule 905 (BOE authority to assess electrical generating facilities is found in Article XIII, section 19, of California's Constitution).

CEQA Article 9(a), Section 15131, states the following with regard to economic and social effects:

- Economic or social effects of a project shall not be treated as significant effects on the environment. An Environmental Impact Report (EIR; a document prepared pursuant to CEQA) may trace a chain of cause and effect from a proposed decision on a project through anticipated economic or social changes resulting from the project to physical changes caused in turn by the economic or social changes. The intermediate economic or social changes need not be analyzed in any detail greater than necessary to trace the chain of cause and effect. The focus of the analysis shall be on the physical changes.
- Economic or social effects of a project may be used to determine the significance of physical changes caused by the project. For example, if the construction of a new freeway or rail line divides an existing community, the construction would be the physical change, but the social effect on the community would be the basis for determining that the effect would be significant. As an additional example, if the construction of a road and the resulting increase in noise in an area disturbed existing religious practices in the area, the disturbance of the religious practices could be used to determine that the construction and use of the road and the resulting noise would be significant effects on the environment. The religious practices would need to be analyzed only to the extent to show that the increase in traffic and noise would conflict with the religious practices. Where an EIR uses economic or social effects to determine that a phys-

ical change is significant, the EIR shall explain the reason for determining that the effect is significant.

- Economic, social, and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce or avoid the significant effects on the environment identified in the EIR. If information on these factors is not contained in the EIR, the information must be added to the record in some other manner to allow the agency to consider the factors in reaching a decision on the project.

The other California regulations pertain to social infrastructure and government revenues. Section 73 of the California Revenue and Taxation Code allows a property tax exclusion for certain types of solar energy systems installed between January 1, 1999, and December 31, 2016. This section was amended in 2008 to include the construction of an active solar energy system incorporated by an owner-builder in the initial construction of a new building that the owner-builder does not intend to occupy or use.

California Education Code, Section 17620, authorizes the governing board of any school district to levee a fee, charge, dedication, or other requirement against any construction within the boundaries of the district for the purpose of funding the construction or reconstruction of school facilities. California Government Code, Sections 65996–65997 includes provisions for school district levies against development projects. This section includes a discussion of school districts in the vicinity of the DHSP. Property Tax Rule 905 allows for the assessment of taxes on electric generation facilities.

The responsibilities of California utility operators working in the vicinity of utilities are detailed in Section 1, Chapter 3.1, "Protection of Underground Infrastructure" (Article 2 of California Government Code §§42 16-4216.9). This law requires that an excavator must contact a regional notification center at least two days prior to excavation of any subsurface installation. Any utility provider seeking to begin a project that may damage underground infrastructure can call Underground Service Alert, the regional notification center. Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the project. Representatives of the utilities are required to mark the specific location of their facilities within the work area prior to the start of project activities in the area.

Local

The proposed project or its alternatives would be sited only in unincorporated areas in Riverside County, including the unincorporated town of Desert Center. The relevant plans for each of these jurisdictions include land use direction, policy guidance, and consistency zoning. The Riverside County General Plan (General Plan) was updated in 2008 to incorporate 19 more detailed Area Plans, including one for Desert Center. The Fiscal/Financial Analysis evaluates the potential for population and economic growth over the next 20 years, and the General Plan identifies areas suitable for development of the economic base and transportation system of Riverside County. The land use element designates the distribution and intensities of use, including residential, commercial, industrial, public facilities, and open space, for the entire county. The safety element establishes policies and programs to protect the community from risks associated with seismic, geologic, flood, and wildfire hazards; and the multipurpose open space element

provides management of the availability for parks. The housing element assesses housing needs and proposes residential sites for all economic segments of the County.

The Desert Center Area Plan (DCAP) reflects the limited areas available for development. Most of the area covered by the DCAP is remote, inaccessible, subject to natural hazards, or unable to support intense development due to a lack of public infrastructure and services. The plan, therefore, recommends infill development and expansion of areas contiguous to existing development. Guidance is provided for the transition of the former Kaiser iron ore mining facility to a Class III nonhazardous waste landfill (Eagle Mountain Landfill) with the former Kaiser employee housing area becoming a housing and service area for landfill employees (although a recent legal ruling has halted the landfill project). The area between Desert Center and Lake Tamarisk Park development could accommodate limited future expansion, accompanied by a plan amendment; growth in the area of the airport would be subject to restrictions due to public safety considerations (Riverside County 2003).

The Riverside County Board of Supervisors is considering a proposal to require a two percent franchise fee on gross annual receipts from solar energy projects. The fee is proposed to offset the social, environmental, and infrastructural impacts associated with expected solar development. The proposed fee would generate more than 30 million dollars annually for the county (Riverside County Board of Supervisors 2011). The fee is opposed by representatives of the Solar Industry and worker's unions, citing the potential loss of renewable energy employment (Berkman 2011). The proposal is still being reviewed by the County Board of Supervisors as of October 18, 2011 (Riverside County Riverside County Board of Supervisors 2011).

3.15.2 Existing Conditions

Regional Setting and Approach to Data Collection

This section presents an overview of the regional setting and comprehensive baseline population, housing, and employment data, as well as information on utilities and public services within the project study area for socioeconomic resources, which involves three subsets:

- The discussion of income and employment includes all of Riverside County and San Bernardino County because this is the area from which the labor force would be drawn, according to the Applicant (see Chapter 2);
- The discussion of public services and facilities also includes a large portion of Riverside County since, in general, these are supplied from a wider area than the unincorporated communities next to the Proposed Action and by regional providers; and
- The discussion of the area that would be affected with respect to social values, the potential for disruption of businesses, and potential disruption of utilities and public services is limited to Desert Center, Lake Tamarisk Park, and Eagle Mountain Village, as well as to businesses and residences next to construction activities.

The term "regional" is used to describe employment and income and the supply area from which public services and facilities are derived; the term "local" is used to describe social values, individual businesses, and the area where public services and utilities could be affected by the proposed project and alternatives.

The project study area lies entirely within unincorporated Riverside County. The proposed generation facility would be located entirely on BLM-administered land, but portions of all of the corridors for the gen-tie line alternatives would traverse private land. The nearest populated areas include the unincorporated town of Desert Center, the Lake Tamarisk Park development, and Eagle Mountain Village. The nearest incorporated population centers include Blythe, Coachella, and Indio in Riverside County, and Twentynine Palms in San Bernardino County.

Socioeconomic data were collected for jurisdictions in the vicinity of the proposed project that could be affected and would contribute to the construction labor force. Demographic, economic, and environmental justice data are derived from the California Department of Finance (CADOF), the U.S. Bureau of Economic Analysis (BEA), the BLM, the Applicant, and Riverside County. Public services and utility information was collected from planning documents or other published information from the jurisdictions in the project study area.

Population and Housing

There are 26 incorporated areas within Riverside County, where the majority (about 78 percent of its population) resides. With a population of 2,189,641 as of April 2010, it ranks as the fourth most populous of California's 58 counties, after Los Angeles, San Diego, and Orange Counties. Table 3.15-1 shows the historic population data (for 1990 and 2000) and the 2010 census population data for Riverside County and the State. As identified in Table 3.15-1, the population of Riverside County grew by more than twice the rate of the State between 1990 and 2000 and more than four times the rate of the State between 2000 and 2010. Between 1990 and 2000, the population in incorporated areas was greater than in unincorporated areas, and most population growth occurred in incorporated areas (BLM 2011; CADOF 2011a). The most current population counts for unincorporated areas in Riverside County are available from the U.S. Census Bureau for the 2010 Census. As of 2010, Census Block data show that the population of Desert Center is 85, based on 14 census blocks analyzed and the population of Lake Tamarisk Park is 174, based on 15 census blocks analyzed. Since 2007, the dominant source of population increase in Riverside County has been from natural increase; in the previous years since 1999 the population increase had been dominated by in-migration (CADOF 2011b).

Table 3.15-1. Current and Historic Population

Location	1990	2000	Percent Change 1990–2000	2010	Percent Change 2000–2010
Riverside County (number)	1,144,400	1,535,125	34.14%	2,189,641	42.64%
Riverside County (percent of State total)	3.87	4.55		5.88	
Incorporated	765,800	1,117,163	45.88	1,685,249	50.85
Blythe	13,271	20,465	29.14	20,817	1.73
Coachella	17,139	22,724	32.58	40,704	79.12
Indio	37,691	49,116	30.31	76,036	54.81
Unincorporated	378,600	417,962	10.40	504,392	20.68
California	29,558,000	33,721,583	14.09	37,253,956	10.48

Source: BLM 2011; CADOF 2011a, 2011b

As shown in Table 3.15-2, the population of Riverside County is forecast to grow by a greater percentage than the State throughout the planning period, increasing by over 60 percent between 2010 and 2030 (CADOF 2007).

In Riverside County, the vacancy rate in 2010 for single- and multiple-family housing units and mobile homes in both incorporated and unincorporated portions of the county was approximately 14 percent. Table 3.15-3 identifies the housing vacancy of the incorporated areas nearest to the project study area. Indio had the highest vacancy rate of the nearby cities and the largest number of vacant units.

Table 3.15-2. Population Projections

Year/Location	Population	Percent Change
2020		
Riverside County	2,904,848	29.74%
California	44,135,923	12.78
2030		
Riverside County	3,507,498	20.75%
California	49,240,891	11.57
2010 to 2030 Change		
Riverside County	1,317,857	60.19%
California	11,986,935	32.18

Source: CADOF 2007.

Table 3.15-3. 2010 Housing Characteristics

Location	Total Housing Units	Percent Vacant	Number Vacant
Riverside County	800,707	14.29%	114,447
Incorporated	627,564	14.49	90,956
Blythe	5,473	17.54	960
Coachella	9,903	9.14	905
Indio	28,971	19.31	5,593
Unincorporated	173,143	13.57	23,491
Twentynine Palms, San Bernardino County	9,431	14.17	1,336

Source: CADOF 2011c

Research shows that construction workers would commute as much as two hours each direction from their communities rather than relocate (BLM and CEC 2009), and the Applicant has indicated that, to the extent possible, the labor force for the DHSP would be derived from Riverside County (much of which is within this two-hour commute window). However, some employees may choose temporary lodging facilities closer to the DHSP in nearby municipalities. Hotels and rooms available in Riverside County totaled 22,508 rooms and 242 properties as of December 2008 (BLM 2011). Relative to the proposed solar facility, the closest community is the Town of Desert Center; however, information regarding the availability of lodging in Desert Center was not available. The closest municipality to the east is Blythe, at 48 miles, and to the west is Indio, at 49 miles. Between Blythe and Indio there are about 35 lodging facilities offering an average of roughly 55 rooms per facility.

The environmental baseline for the DHSP includes the preliminary construction of the Desert Sunlight Solar Farm project which has been underway in September 2011. Construction workers for this project were also assumed to be housed in nearby communities including Blythe and Indio. Although availability and lodging cost is subject to change based on season and demand, room rates in the project study area range between $40 and $120. Municipalities to the north and south, such as Twentynine Palms and Brawley, would be less likely to provide lodging that would be appropriate in terms of proximity, driving time, or cost.

Employment and Income

During construction, the solar facility workforce is expected to average 100, with a peak of 250 total on-site workers. The workforce for the gen-tie line is expected to average 30 employees over the 20-month gen-tie line construction period, with a peak of 65 employees. As previously stated, the Applicant has indicated that the construction workforce would be recruited from within Riverside County, San Bernardino County, and elsewhere in the surrounding area, as

available and would not be expected to relocate closer to the project (BLM and CEC 2009). Table 3.15-4 provides the most current data available on employment sectors in Riverside and San Bernardino Counties. As shown in Table 3.15-4, most industry sectors in these counties provided similar levels of employment to those of the State. Construction was one of the largest employment sectors in Riverside and San Bernardino Counties, with a higher percentage of the population employed than at the State level. Government was the largest employer in both Riverside and San Bernardino Counties, with local government providing the majority of the employment in this sector.

The historic trend between 1990 and 2000 shows that the labor force in Riverside County increased by about 27 percent, and that the unemployment rate decreased from 7.2 percent to 5.4 percent. Between 2000 and 2007 the labor force increased by another 34 percent, but unemployment also increased to 6.0 percent. By 2008 unemployment had reached an annual average of 8.6 percent, with a total of 78,967 unemployed out of a labor force of 918,845 (BLM 2011; BLS 2011a). In June 2010 and 2011 the percentage of unemployment in California, at 12.2 percent and 12.1 percent, was lower than for Riverside County at 14.5 percent and 14.4 percent, for these years (BLS 2011a and 2011b).

Between 1980 and 2007, per capita personal income in Riverside County remained below the State average, with a gap that has widened in almost every year. The widest gap between the County and State averages was in 2007 at $12,245. In 2007, per capita personal income in Riverside County was $29,560; while, the State average was $41,805. High average per capita incomes in San Francisco, San Mateo, Santa Clara, Contra Costa, Napa, and Orange Counties helped to boost the overall State average (BLM 2011).

Table 3.15-4. Employment by Industry in Riverside and San Bernardino Counties

NAICS Industry	Riverside County Employment (Number)	Riverside County Employment (Percent of Total County Employment)	San Bernardino County Employment (Number)	San Bernardino County Employment (Percent of Total County Employment)	California Employment (Percent of Total State Employment)
Total employment	807,078		876,206		
Wage and salary employment	594,330	73.64%	698,761	79.75%	77.81%
Proprietors employment	212,748	26.36	177,445	20.25	22.19
Farm proprietors employment	2,896	0.36	1,209	0.14	0.33
Nonfarm proprietors employment	209,852	26.00	176,236	20.11	21.86
Farm employment	7,685	0.95	2,972	0.34	1.08
Nonfarm employment	799,393	99.05	873,234	99.66	98.92
Private employment	670,436	83.07	733,956	83.77	85.60
Forestry, fishing, and related activities	7,016	0.87	961	0.11	1.03
Mining	2,022	0.25	1,124	0.13	0.27
Utilities	1,884	0.23	4,276	0.49	0.30
Construction	62,194	7.71	53,914	6.15	5.45
Manufacturing	43,433	5.38	62,611	7.15	7.26
Wholesale trade	24,059	2.98	39,265	4.48	3.82
Retail trade	98,101	12.16	105,396	12.03	9.88
Transportation and warehousing	25,707	3.17	57,327	6.54	2.94

Table 3.15-4. Employment by Industry in Riverside and San Bernardino Counties

NAICS Industry	Riverside County Employment (Number)	Riverside County Employment (Percent of Total County Employment)	San Bernardino County Employment (Number)	San Bernardino County Employment (Percent of Total County Employment)	California Employment (Percent of Total State Employment)
Information	9,656	1.20	9,031	1.03	2.65
Finance and insurance	40,123	4.97	29,569	3.37	4.73
Real estate and rental and leasing	40,692	5.04	38,319	4.37	5.03
Professional, scientific, and technical services	43,411	5.38	36,761	4.20	8.61
Management of companies and enterprises	3,329	0.41	6,746	0.77	1.07
Administrative and waste management services	53,062	6.57	71,916	8.21	6.30
Educational services	9,924	1.23	12,089	1.38	2.00
Health care and social assistance	70,284	8.71	82,974	9.47	8.70
Arts, entertainment, and recreation	18,118	2.24	12,184	1.39	2.61
Accommodation and food services	65,512	8.12	56,626	6.46	6.93
Other services, except public administration	51,909	6.43	52,867	6.03	6.02
Government and government enterprises	128,957	15.98	139,278	15.90	13.31
Federal, civilian	6,969	0.86	12,954	1.48	1.20
Military	3,559	0.44	20,004	2.28	1.08
State and local	118,429	14.67	106,320	12.13	11.04
State government	13,270	1.64	12,670	1.45	2.42
Local government	105,159	13.03	93,650	10.69	8.62

Source: BEA 2011

Public Services and Utilities

The public services and utilities in Riverside County discussed in this section include schools, hospitals, fire response, police departments, electrical and natural gas service, water districts, and cable and telecommunications suppliers. These are services that could be affected either by construction of the proposed project and alternatives or population growth if it were to result from the proposed project and alternatives.

There were 472 schools in Riverside County in the 2009 to 2010 fiscal year, with a total enrollment of 423,412 students and a pupil-to-teacher ratio of 23.1. These schools included 278 elementary schools with 198,901 students, 77 middle schools with 84,068 students, 57 high schools with 120,376 students, and 6 kindergarten-through-twelfth-grade schools with 5,462 students. The school nearest to the solar facility, the Eagle Mountain Elementary School, is part of the Desert Center Unified School District. It had an enrollment of 19 students in 2009 to 2010 and is located along Kaiser Road in the project study area. Palo Verde Valley High School and Palo Verde College are about 40 miles southeast solar generation facility along I-10. Indio High School, La Quinta High School, and Page Middle School are about 45 miles southwest of the project study area along I-10, and Twentynine Palms High School in San Bernardino County, north of JTNP is the nearest school to the north (Education Data Partnership 2011).

Thirty-seven hospitals are located in Riverside County. Closest to the DHSP are Palo Verde Hospital in Blythe, John F. Kennedy Memorial Hospital in Indio, Eisenhower Medical Center in Rancho Mirage, Desert Regional Medical Center in Palm Springs, High Desert Medical Center in Joshua Tree (San Bernardino County), and Angel View Children's Hospital in Desert Hot Springs (California Gazetteer 2011).

All fire stations in Riverside County are dispatched by the California Department of Forestry and Fire Protection (CAL FIRE) Riverside Unit/Riverside County Fire Department Emergency Command Center and are part of the "Integrated Fire Protection System," under contract with the State. Ninety-nine fire stations or dispatch centers are within Riverside County, of which 84 have paramedic firefighters, seven are fire stations only, five are volunteer fire companies only, and three are municipal fire departments that contract with Riverside County for dispatch services. Closest to the project study area are the Lake Tamarisk Fire Station in Desert Center (with one County paramedic assessment engine), Blythe Air Base in Blythe (with one County paramedic assessment engine), Riverbend Volunteer Fire Department in Blythe, La Quinta South Fire Station in La Quinta (with one City paramedic assessment engine and one County brush engine), Coachella Fire Station (with one City paramedic assessment engine), Sun City Shadow Hills Station in Indio (with one City paramedic assessment engine), and Indio, North Indio, and West Indio Fire Stations (Riverside County Fire Department 2011).

The Riverside County Sheriff's Department provides police services in unincorporated Riverside County and provides contract services to individual municipalities in Riverside County. The Colorado River Station in Blythe provides service to the unincorporated area from Red Cloud Road on the west, to the Arizona state line on the east, and the Imperial County line on the south to the San Bernardino County line on the north. Communities included in this area are Desert Center, Eagle Mountain, East Blythe, Midland, Nicholls Warm Springs, Ripley, and the Colorado River (Riverside County Sheriff's Department 2011). Similarly, the project study area falls within the Border Division of the California Highway Patrol. This division has 12 area offices: Blythe, San Juan Capistrano, El Cajon, Imperial, Indio, Oceanside, San Diego (division office), Beaumont, Santa Ana, Temecula, Westminster, and Felicity. Additionally, the Border Division of the Highway Patrol contains four residential posts, five commercial inspection facilities, two transportation management centers, 900 uniformed officers, and 380 nonuniformed personnel (California Highway Patrol 2011).

SCE provides electric power service to the project study area. An existing SCE 161 kV transmission line crosses Eagle Mountain Road, Kaiser Road, and Desert Center Rice Road from the northwest to the southeast from about 1 mile north of the Eagle Mountain Substation toward Blythe, and the SCE Devers Palo Verde (DPV) transmission line is along I-10 on the south side of the highway. The DPV2 transmission line that would parallel the existing DPV1 transmission line is under construction. MWD owns the Eagle Mountain Substation along Powerline Road, as well as the 230 kV transmission line and 33 kV distribution line along Powerline Road (BLM 2011).

Additional public utilities in the study area are provided by the following:

- Water: MWD;
- Natural Gas: Southern California Gas Company;
- Waste Management: Riverside County Waste Management Department; and
- Telecommunications: Sprint Communications, AT&T Communications, and AT&T California.

3.16 ENVIRONMENTAL JUSTICE

This section provides an overview of the applicable plans, policies, and regulations and existing conditions for environmental justice. The project study area for environmental justice encompasses the Census Tracts that includes all areas within one-half mile (0.5 miles) of the proposed project and alternatives. Data are provided for Riverside County, for local communities where applicable and available, and for California for comparison.

3.16.1 Applicable Plans, Policies, and Regulations

Federal

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that federal agencies, as well as state agencies receiving federal funds, identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

State

There are no California state regulations regarding environmental justice that apply to the proposed project and alternatives.

Local

There are no Riverside County regulations regarding environmental justice that apply to the proposed project and alternatives.

3.16.2 Existing Conditions

Several steps have been undertaken in order to protect low income and minority populations from disproportionate impacts from the proposed project and alternatives, including public outreach and a screening analysis of potential environmental justice populations in the vicinity of the proposed project. Public outreach to the communities and residents that could be affected by the proposed project and alternatives, including low-income and minority populations, is discussed in Section 5 (Consultation) and includes public scoping. In addition, the BLM has engaged in official government-to-government consultation with all Native American tribes that could be affected by the proposed project and alternatives.

The intention of an environmental justice screening analysis is to determine whether a low-income and/or minority population exists within the potential affected area of a proposed action. As defined by the "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses" (EPA 1998), minority and low-income populations are identified where either:

- The minority or low-income population of the affected area is greater than 50 percent of the affected area's general population; or
- The minority or low-income population percentage of the affected area is meaningfully greater (50 percent or greater) than the minority or low-income population percentage in the general population of the jurisdiction or other appropriate unit of geographic analysis (i.e., County, State, or Native American reservation) where the affected area is located.

The demographic data in this section present the distributional patterns of minority populations and low-income populations for the immediate vicinity of the proposed project and alternatives, Riverside County, and the State of California.

Census Block Group data on poverty levels and racial and ethnic population distribution provide the finest scale of screening data that is widely available. Ethnic data are available from the 2010 census; however, the most recent information on poverty at this resolution dates back to 2000. Therefore additional, more recent, county-level data are provided to supplement the poverty-level information and identify the direction of changes to the income and racial and ethnic composition of the project study area. Census Block Group data, Census Tract data, county data, and state averages are all compared to determine whether the local ethnic and poverty distribution differs from the California average.

In 2000, the project study area lay within one Census Tract (458) in Riverside County and three Block Groups (3, 5, and 6). In the 2010 census, the study area lay entirely within one Census Tract (469) in Riverside County, which contained only one Block Group (1).

Table 3.16-1 shows that in 2000, Census Tract 458, in which all elements of the proposed project and alternative are situated, had a higher percentage of black or African American, American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, Some Other Race, and Hispanic minority populations than the county average or State average for that same year. In 2010, Census Tract 469 had a higher percentage of white and Hispanic populations than county and State averages, and lower percentages of Asian, black, and total minority populations. The Asian population in the project study area was much lower than State and county averages in both 2000 and 2010. Data from 2010 indicate that the overall percentage of minorities decreased for the Census Tract, but the percentage of the Hispanic minority increased.

Table 3.16-1. Population by Percentage Race/Ethnicity

	2000				2010		
Percent Race/Ethnicity	California	Riverside County	Census Tract 458	Block Groups 3, 5, 6	California	Riverside County	Census Tract 469
White	46.70%	51.04%	27.92%	26.71%	40.1%	39.7%	42.68%
Black or African American (not Hispanic)	6.44	5.98	20.68	21.39	5.8	6.0	1.66
American Indian and Alaska Native (not Hispanic)	0.53	0.66	0.84	0.78	0.4	0.5	0.59
Asian (not Hispanic)	10.77	3.57	1.31	1.34	12.8	5.8	0.59
Native Hawaiian and Other Pacific Islander (not Hispanic)	0.31	0.21	0.34	0.35	0.3	0.3	0.10
Some other race (not Hispanic)	0.21	0.16	1.21	1.26	0.2	0.2	0.20
Two or more races (not Hispanic)	2.67	2.17	0.85	0.88	2.6	2.2	1.91
Hispanic of all races	32.38	36.21	46.83	47.29	37.6	45.5	52.28
All minorities	50.43	46.63	70.00	71.15	57.02	60.5	55.41

Source: U.S. Census Bureau 2010a, 2010b, 2000a, and 2000b; CADOF 2011d.

The U.S. Census Bureau uses a set of income thresholds to determine which families are living in poverty; the thresholds vary by family size and composition. If a family's total income is less than the respective threshold, then that family, and every individual in it, is considered to be living in poverty. The poverty thresholds do not vary geographically but they are updated annu-

ally for inflation using the Consumer Price Index. For example, in 1999 the average estimated poverty threshold for an individual was an annual income of $8,501, and for 2010 it was $11,139 (U.S. Census 2010 and 2011). According to U.S. Census 2000 estimates for the year 1999 (Table 3.16-2), the percentage of the population of Census Tract 458 living below the poverty line, although well below 50 percent, was greater than that of either Riverside County or the State. The percentage of the population living below the poverty line in Census Blocks 3, 5, and 6 were below that of Riverside County and the State at 4.3 percent. In 1999, the median household income for Census Tract 458 was about 70 percent of the Riverside County average and 63 percent of the State average (U.S. Census 2000c). In 2010, the percentage of the population living in poverty in Riverside County dropped below the State average, while the median income for the County continued to be lower than the State average (U.S. Census 2010b). Poverty data for Census Blocks 3, 5, and 6 for 2009 are not available.

Table 3.16-2. Poverty Characteristics

	1999		2010	
Location	Poverty Line Income for Individuals	Percent Below Poverty Line	Poverty Line Income for Individuals	Percent Below Poverty Line
Census Tract 458 (2000) or 469 (2010)	$8,501	21.4%	N/A	N/A
Census Block Groups 3, 5, and 6 (2000) or Group 1 (2010)	8,501	4.3	$11,139	N/A
Riverside County	8,501	14.2	11,139	13.9%
California	8,501	14.2	11,139	14.2

Source: U.S. Census Bureau 2000c, 2002, 2009b, and 2009c.

3.17 SPECIAL DESIGNATIONS

This section describes the environmental and regulatory settings associated with the construction and operation of the proposed DHSP or its alternatives with respect to special designations. Specially designated lands are identified for the region surrounding the project study area. The project study area includes all areas with special designations that could be affected by construction, operation, and decommissioning of the DHSP, and is bounded by the northern boundary of the Joshua Tree Wilderness Area south to the southern boundary of the Chuckwalla Mountains Wilderness Area, and bounded on the east and west by the outer boundaries of these Wilderness Areas. The project study area includes Alligator Rock Area of Critical Environmental Concern (ACEC), Desert Lily Preserve ACEC, Chuckwalla Desert Wildlife Management Area (DWMA), and the Palen-Ford Wildlife Habitat Management Area (WHMA).

3.17.1 Applicable Plans, Policies, and Regulations

Federal Laws and Regulations

Federal Land Policy Management Act of 1976

The designation of Areas of Critical Environmental Concern (ACECs) was authorized in Section 202 (c)(3) of FLPMA, and was designed to be used as a process for determining the special management required by certain environmental resources or hazards (BLM 1980). According to Section 103(a) of FLPMA, an ACEC is defined as the following:

> *An area within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.*

Prior to its designation, management prescriptions are developed for each proposed ACEC. These prescriptions are site-specific and include actions that the BLM has authority to implement, as well as recommendations for actions that the BLM does not have direct authority to implement, such as cooperative agreements with other agencies and mineral withdrawals (BLM 1980).

Wilderness Act of 1964

Wilderness Areas (WAs) are designated by Congress, under the authority of the Wilderness Act of 1964 as part of the National Wilderness Preservation System, and are managed by one of the following four land management agencies: the BLM, the U.S. Fish and Wildlife Service (USFWS), the U.S. Department of Agriculture (USDA) Forest Service, or the National Park Service.

The Wilderness Act defines wilderness as follows:

> *(c) A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this chapter an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and*

> *which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.* (Public Law 88-577, Section 2[c])

A number of uses are specifically prohibited within WAs. Prohibited uses include commercial enterprises; permanent and temporary roads (with exceptions for administration and emergency purposes); use of motorized vehicles, equipment, motorboats, or mechanical transport; landing of aircraft; or the erection of a structure or installation (Public Law 88-577, Section 4[c]).

California Desert Protection Act of 1994

The CDPA designated 69 WAs on BLM-managed public lands in the California Desert. The CDPA states that "wilderness is a distinguishing characteristic of the public lands in the California desert" and "The wilderness values of desert lands are increasingly threatened by . . . development." The CDPA further states that there are no buffer zones designated along with wilderness areas: "The fact that nonwilderness activities or uses can be seen or heard from areas within a wilderness area shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area [Public Law 103-433, Section 103(d)].

BLM Policy and Plans

BLM Manual 8560, Management of Designated Wilderness Areas

This manual section identifies the BLM's role in administering WAs on public lands, provides policy guidance for BLM personnel, and sets the framework for wilderness management program development. It states the goals of wilderness management, as well as administrative functions and specific activities related to wilderness management.

California Desert Conservation Area Plan

The CDCA is a 25-million acre expanse of land in southern California designated by Congress in 1976 through FLPMA. The BLM administers about 10 million of those acres. When Congress created the CDCA, it recognized its special values, proximity to the population centers of southern California, and the need for a comprehensive plan for managing the area. Congress stated that the CDCA Plan must be based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The site of the proposed project and alternatives is located within the CDCA. The primary active wildlife management tools used in the CDCA Plan are ACECs. Refer to Sections 3.3 (Wildlife), 3.4 (Vegetation), and 3.11 (Lands and Realty) for a more detailed discussion of these aspects of the CDCA Plan.

Northern and Eastern Colorado Desert Coordinated Management Plan

The Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) was prepared under the regulations implementing FLPMA. The NECO plan established regional standards for public land health and set forth guidelines for grazing management. The NECO plan also established two Desert Wildlife Management Areas (DWMAs) encompassing 1.75 million acres that are managed as ACECs for recovery of the desert tortoise. Southern Mojave and

Sonoran Wildlife Habitat Management Areas (WHMAs) for bighorn sheep were established totaling over 1 million acres and 13 multi-species WHMAs totaling over 500 million acres such that 80 percent of the distribution of all special status species and all natural community types are included in conservation areas. The NECO plan also combined herd management areas for wild horses and burros, designated routes of travel, identified principles for acquisition of private lands and disposal of public lands, provided access to resources for economic and social needs; and incorporated 23 wilderness areas established by the 1994 CDPA in the CDCA.

Local Regulations

County of Riverside General Plan, Desert Center Area Plan, 2003

This Plan describes a multi-purpose open space element for the unincorporated areas of Riverside County and Desert Center. It defines local open space policies that relate to wildlife habitat, particularly desert tortoise, and aims to preserve the desert environment. The three local open space policies defined for Desert Center within the Riverside County General Plan are:

- Encourage clustering of development for the preservation of contiguous open space;
- Work to limit OHV use within the Desert Center Area Plan; and
- Require new development to conform with desert tortoise critical habitat designation requirements.

A more specific discussion of the Riverside County General Plan is provided in Section 3.11, Lands and Realty.

3.17.2 Existing Conditions

The locations of all lands with special designations in the project study area are shown in Figure 2-1 in Appendix A.

Areas of Critical Environmental Concern

There are two ACECs near the DHSP site, as well as one DWMA and one WHMA, both of which are considered ACECs:

- Alligator Rock ACEC,
- Desert Lily Preserve ACEC,
- Chuckwalla DWMA, and
- Palen-Ford WHMA.

The first two ACECs were officially designated with the approval of the CDCA Plan in 1980. No project activities are proposed within an ACEC. The Chuckwalla DWMA was designated to protect desert tortoise habitat in the Northern and Eastern Colorado Desert Coordinated Management Plan. Management emphasis for the Palen-Ford WHMA is on the management of the dunes and playas within the Palen-Ford dune system.

Alligator Rock ACEC

Covering 7,726 acres, this ACEC was established to protect archaeological values. Prehistoric activities represented at archaeological sites within the ACEC included milling seeds and other

food products, manufacturing stone tools, storing food and other items, temporary habitation, travel, trade, hunting, artistic endeavor, and possibly religious or ritual activity. The Alligator Rock ACEC was so designated not only because of the unusual array of archaeological sites present, but also because these sites are endangered by current use of the area for a number of activities, particularly recreation. Two sites within the ACEC have been listed on the National Register of Historic Places (BLM 1986).

Actions taken to protect the sensitive resources within this ACEC include designating road closures in certain areas to prevent vehicular damage to archaeological sites, and implementing physical protection measures, continued inventorying, and monitoring (BLM 1986). It is located approximately 6 miles south of the proposed solar facility site.

Desert Lily Preserve ACEC

This ACEC covers 2,031 acres and was established to protect botanical values, in particular, the desert lily (*Hesperocallis undulata*). This area is withdrawn from all forms of appropriation including mineral extraction, and is bound on the western edge by a fence bordering Highway 177. It is located 2.6 miles southeast of the proposed solar facility site. This ACEC has a parking area and is one of the few recreational attractions in the project study area. The ACEC receives a few hundred visitors per year for car and RV camping, photography, and nature study.

Chuckwalla DWMA

The Chuckwalla DWMA was designated to protect desert tortoise as well as significant natural resources, including special status plant and animal species and natural communities. It encompasses 818,685 acres, 465,287 acres of which (57 percent) are on BLM land. Conservative estimates based on the USGS habitat model indicate that approximately 70 percent of the Chuckwalla DWMA is suitable desert tortoise habitat with the remaining 30 percent unsuitable. As defined in the NECO Plan, examples of management actions to protect resources within the Chuckwalla DWMA include limiting cumulative new surface disturbance on lands administered by the BLM within any DWMA to 1 percent of the BLM-administered portion of the DWMA, and implementing grazing, recreation, and travel restrictions.

Palen-Ford WHMA

While DWMAs were established in the NECO Plan to address the recovery of the desert tortoise, WHMAs were established to address other special-status species and habitat management. Management emphasis is placed on active management, specific species and habitats mitigation, and restoration from authorized allowable uses. The special situation of "fixed-point" rare plants is also addressed. The Palen-Ford WHMA was specifically established to protect the dunes and playas (NECO sensitive habitat types) and the Mojave fringe-toed lizard (BLM and CDFG 2002). The Palen-Ford WHMA includes 39,366 acres of Sonoran creosote scrub, 13,104 acres of desert dry wash woodland, 17,690 acres of sand dunes, 381 acres of chenopod scrub, 13,696 acres of playas, and 152 acres of agriculture and urban uses (Palen Solar Project PA-FEIS, Appendix I, 2011).

Wilderness

The Chuckwalla Mountains Wilderness to the south and the Joshua Tree Wilderness to the west, north, and east are the WAs closest to the DHSP area. The Palen-McCoy Wilderness is farther

away, approximately 11 miles to the east. Project activities are not proposed within any Wilderness Area. In areas designated as a wilderness, use of motorized or mechanized vehicles or equipment by the public is not permitted. These wilderness areas have no trails, facilities, or water and receive little recreation use. Though permitted, there is no record of hunting, fishing, or trapping in these areas. Short day hikes may occur, but backpacking or camping has not been observed or recorded. There are no trailheads, parking, or other access to the Joshua Tree Wilderness from the project site, or nearby. The Chuckwalla Mountains Wilderness Area is more accessible due to the Corn Springs Campground, which is surrounded by the wilderness.

Joshua Tree National Park Wilderness

The 594,502-acre Joshua Tree National Park Wilderness, which is administered by the National Park Service, is approximately 42 miles west of Blythe, California. Designated in 1976 by the Wilderness Act, the Joshua Tree Wilderness became part of JTNP in 1994 when the park (then a National Monument) was expanded and designated as a National Park by the California Desert Protection Act. This Wilderness Area is approximately 3.8 miles west and 1.8 miles north of the DHSP site. The proposed solar facility site and gen-tie alternative E would pass within 2 miles of the boundary of the Park and the Wilderness Area near the southern end of the Coxcomb Mountains. The steep terrain of this WA provides views to the south and west, which overlook the project site. Some visitors are likely to access this area because of its proximity to Highway 177. In general, however, much of the park in this area is difficult to access because of the steep terrain and lack of trails.

This WA is composed of two unique desert ecosystems. The Colorado Desert to the east is home to abundant creosote, the spidery ocotillo, and the jumping cholla cactus. The Mojave Desert covers the western area and is home to the wilderness namesake, the Joshua tree. Visitors to this wilderness seek desert experiences with opportunities for solitude and unconfined recreation. Aerial photography shows no trails or other established routes within this wilderness segment. Visitor use and visitor preference data for the WA are not available, as the Park does not require visitor registration for entrance to the WA. However, a 2010 JTNP visitor survey revealed that the most important attributes/resources to visitor groups in the Park as a whole were (1) Views without development, (2) Clean air, (3) Natural quiet/sounds of nature, (4) Desert plants/wildflowers, (5) Native wildlife, (6) Access to rock formations, (7) Solitude, (8) Dark, starry night skies, and (9) Access to historical/cultural sites (Jette et al. 2011). The WA closest to the DHSP site can be accessed three ways: (1) the west entrance is 5 miles south of the junction of State Highway 62 and Park Boulevard at Joshua Tree Village; (2) the north entrance is in the community of Twenty-Nine Palms; and 3) the south entrance is 20 miles east of Indio and approximately 27 miles west of Desert Center and can be approached from I-10.

Chuckwalla Mountains Wilderness

The Chuckwalla Mountains WA is located approximately 40 miles west of Blythe, California, and covers 99,548 acres. This WA is approximately 6 miles south of the solar facility site. It was designated by the CDPA in 1994. It is composed of a variety of landforms, such as steep-walled canyons, inland valleys, large and small washes, isolated rock outcrops, and vast desert expanses. As a result, it provides habitat for a variety of plant and wildlife species, including bighorn sheep, burro deer, desert tortoise, ocotillo, and barrel and foxtail cactus. The area can be accessed from both the west and east from I-10.

Hunting, fishing, and non-commercial trapping are allowed under state and local laws. Pets and horses are permitted. This WA overlooks the solar facility site.

Palen/McCoy Wilderness

The Palen/McCoy Wilderness Area encompasses approximately 236,488 acres. Within it are the Granite, McCoy, Palen, Little Maria and Arica Mountains, which are five distinct mountain ranges separated by broad sloping bajadas. The diversity of vegetation and landforms is exceptional because this large area incorporates so many major geological features. The desert wash woodland found here provides food and cover for burro deer, coyote, bobcat, gray fox and mountain lion. Desert pavement, bajadas, interior valleys, canyons, dense ironwood forests, canyons and rugged peaks form a constantly changing landscape pattern. State Highway 62, near the Riverside County line provides access from the north, and I-10 via the Midland Road near Blythe provides access from the south. The area is accessible by four-wheel drive vehicles only. Mechanized or motorized vehicles are not permitted within the boundaries of Wilderness Areas. This WA is 10 miles east of the proposed solar facility site.

Lands with Wilderness Characteristics

All Public Lands within the BLM's California Desert District were analyzed and summarized in 1979 wilderness inventory decisions performed pursuant to the FLPMA. See "California Desert Conservation Area – Wilderness Inventory – Final Descriptive – March 31, 1979." The solar facility site would be located within CDCA Wilderness Inventory Unit (WIU) #CDCA 332.

WIU #CDCA 332, an area of approximately 4,000 acres, is bounded on the southeast by Highway 177, on the southwest by the Kaiser Mine Road and a power line, on the northwest by a transmission line and road associated with the Los Angeles Aqueduct and on the northeast by a road (which forms a portion of the boundary of JTNP). The dominant feature of the WIU is a southerly trending wash. Vegetation is sparse and primarily creosote. Most developments are on private lands. However, there are several rights-of-way within the WIUs associated with the Los Angeles Aqueduct and the Kaiser Mine. The 1979 decision was that the imprints of man were substantially unnoticeable in WIU #CDCA 332. However, WIU #CDCA 332 had no outstanding opportunities for solitude or primitive and unconfined recreation; therefore, it was determined that no wilderness characteristics are present in the area. As a result, no portions of this Public Land were identified as a wilderness study area, and wilderness characteristics are not analyzed further in this EIS.

3.18 TRANSPORTATION AND PUBLIC ACCESS

This section describes the environmental and regulatory settings associated with the construction and operation of the proposed project or its alternatives with respect to transportation and public access in the project study area. The project study area for transportation and public access has four parts: existing state and County maintained roads within 1 mile of the proposed project and gen-tie line alternatives that would be mostly unaffected except for traffic increases that could temporarily affect the level of service or could result in some road damage; off-site existing roads needing improvement to a standard to support construction traffic; off-site new roads needed to access individual structure locations or the ROW; and roads built within the solar facility ROW connecting structure locations.

The project study area for airports includes portions of routes that intersect areas within 3 miles of an airport or airstrip, including the controlled airspace. The project study area for railroads and pipelines is the point of intersection with the ROW. No railroads or pipelines closely parallel the proposed project or gen-tie line alternatives.

3.18.1 Applicable Plans, Policies, and Regulations

California Desert Conservation Area Plan of 1980, as amended

The California Desert Conservation Area (CDCA) Plan, as amended, provides a framework for land management decision-making for the BLM-administered lands in the California Desert District (CDD). First, land is assigned to one of four BLM Multiple Use Classes. Then, specific land management decisions are made as needed based on the uses and usage level appropriate for each class (BLM 1994). The CDCA Plan addresses vehicle travel and access across public lands as follows:

> *The need for access across public lands to permit utilization of State and privately owned lands and to permit authorized developments on public lands, including mining claims, is recognized. The routes of travel and construction standards are subject to such BLM control as is required to prevent unnecessary or undue degradation of the public lands and their resources or to afford environmental protection* (BLM 1994).
>
> *To engage in most desert recreational activities outside of open areas, visitors must use motorized vehicles and usually travel on some previously used or marked motorized-vehicle route. Understandably, vehicle access is among the most important recreation issues in the Desert. A primary consideration of the recreation program, therefore, is to ensure that access routes necessary for recreation enjoyment are provided. Specific route identification, as outlined in the Motorized-Vehicle Access Element, will be initiated upon adoption of this Plan* (BLM 1994).

Northern and Eastern Colorado Desert Coordinated Management Plan (2002)

The Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan) is one of six amendments to the CDCA Plan, discussed in more detail in Section 3.17 (Special Designations).

Federal Aviation Administration Regulations (14 CFR 77)

Title 14 CFR Section 77 contains standards for determining physical obstructions to navigable airspace. Form 7460-1, Notice of Proposed Construction or Alteration, must be filed with the Federal Aviation Administration (FAA) if an object to be constructed has the potential to affect navigable airspace according to these standards.

Federal Transportation Regulations (49 CFR, Subtitle B)

Title 49 CFR, Subtitle B, contains procedures and regulations pertaining to interstate and intrastate transport, including hazardous materials program procedures, and provides safety measures for motor carriers and motor vehicles that operate on public highways.

California Vehicle Code

The California Vehicle Code contains regulations applicable to roadway damage; licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.

California Streets and Highways Code

The California Streets and Highways Code specifies that permits issued by the California Department of Transportation (Caltrans) be required for any roadway encroachment during truck transportation and delivery, as well as for any load that exceeds Caltrans's weight, length, or width standards for public roadways.

County of Riverside General Plan and Desert Center Area Plan

The policies of the Desert Center Area Plan (DCAP; Riverside County 2003) were developed for the Desert Center area in accordance with the vision and policies of the County of Riverside General Plan (Riverside County 2003). The DCAP contains specific policies related to the vehicular circulation system, airports, and scenic highways that are relevant to the proposed project and alternatives.

Riverside County Circulation Element Policy C2.1 requires the County to maintain a countywide target level of service (LOS) of LOS "C" along all County maintained roads and conventional state highways.

County of Riverside Congestion Management Plan

Riverside County's Congestion Management Plan (CMP) specifies that all CMP roadways operate at a Level of Service of "E" or better. All state highways and principal arterials are CMP roadways. I-10 and SR-177 are the only CMP roadways in the project study area.

3.18.2 Existing Conditions

This section provides a discussion of the transportation system in the vicinity of the proposed project and alternatives. The section includes a discussion of roads, traffic, airports, railways, bicycle facilities, and public transportation.

A traffic study was conducted for the Desert Sunlight Solar Farm (DSSF) project (BLM 2011; incorporated by reference in Section 1.11) which would be developed at a site adjacent to the

proposed solar facility site. An additional traffic study was conducted for the DHSP in December 2011. This includes some traffic that is caused by preliminary construction for the DSSF project. The environmental baseline for the proposed project and alternatives includes only the preliminary construction of the DSSF project that had been completed in September 2011. The DSSF project EIS estimated 204 daily employee trips (one-way) and 33 daily construction equipment trips during project construction and those trips are incorporated into the environmental baseline for this EIS.

Roads and Intersections

Roads in the project study area are limited due to the remoteness and lack of development in the area. The primary roads in the vicinity of the proposed project and alternatives are summarized in Table 3.18-1 and described below.

Table 3.18-1. Roads In the Project Area

Road	Generation Direction	Condition	Jurisdiction
I-10	East-west	Major road	Caltrans
SR-177	Northeast-southwest	Major road	Riverside County
Kaiser Road	North-south	Major road	Riverside County
Eagle Mountain Road	North-south	Minor road	Riverside County
Power Line Road	Northeast-southwest	Maintained dirt	Riverside County
Phone Line Road	North-south/east-west	Maintained dirt	Riverside County
Kaiser Steel Road	East-west	Unmaintained dirt	Private
Aztec Avenue	East-west	Minor road	Riverside County
Airport Access Road	East-west	Maintained dirt	Private
Corn Springs Road	Northeast-southwest	Maintained dirt	BLM
Chuckwalla Valley Road	Northwest-southeast	Minor road	Riverside County

Source: BLM 2011.

Interstate 10 (I-10)

I-10 is an east-west interstate with a western terminus in Santa Monica, California, and an eastern terminus in Jacksonville, Florida. In the project study area it has two lanes of travel in each direction. The Annual Average Daily Traffic for I-10 in the project study area was 25,000 in 2010.

State Route 177 (SR-177)

SR-177 is a predominantly north-south road that provides access from Kaiser Road to I-10. It is also known as Desert Center Rice Road, although it will be referred to as SR-177 in this EIS. In the vicinity of the DHSP it is paved with centerline and edge-of-pavement markings, and has one lane of travel in each direction.

Kaiser Road

Kaiser Road would be the primary access road to the proposed solar facility. It is paved, has one lane of travel in each direction and a centerline stripe. It is a predominantly north-south road

with a southern terminus at SR-177 in Desert Center and a northern terminus at the Eagle Mountain Mine.

Aztec Avenue

Aztec Avenue is an east-west road with a western terminus at SR-177 that runs along the southern frontage of I-10 for approximately 1 mile, where it intersects an unimproved pipeline patrol road.

Airport Access Road

This road provides access to the former Desert Center Airport (now a private special-use airport) from SR-177.

Corn Springs Road

Corn Springs Road is an unpaved northeast-southwest road with a northern terminus at Chuckwalla Valley Road and a southern terminus in undeveloped BLM-administered land.

Chuckwalla Valley Road

Chuckwalla Valley Road is a paved road accessed from I-10 approximately 9 miles east of Desert Center.

Eagle Mountain Road

Eagle Mountain Road is primarily a north-south road with a southern terminus just south of I-10 and the Eagle Mountain exit and a northern terminus at the Eagle Mountain townsite.

Power Line Road

Power Line Road is a maintained dirt road that runs northeast-southwest and connects with Kaiser Road. The road parallels Metropolitan Water District of Southern California (MWD) transmission and distribution lines. Off-highway vehicles (OHV) are allowed on this road.

Phone Line Road

Phone Line Road is a maintained dirt road that intersects Power Line Road near Eagle Mountain Road, runs north-south, and then turns northeast at the Eagle Mountain townsite. OHVs are allowed on this road.

Kaiser Steel Road

Kaiser Steel Road is a private east-west unmaintained dirt road owned by Kaiser Ventures. The road parallels an existing Kaiser Ventures distribution line and is used to access two water wells east of the solar facility site. OHVs are allowed on this road west of the intersection with Power Line Road.

Other Roads

Several smaller unpaved and unmaintained local roads or routes have been documented in the project vicinity.

Intersections

The following intersections are the primary intersections that would be traversed by construction traffic associated with the proposed solar facility:

- SR-177 and the I-10 eastbound off-ramp;
- SR-177 and the I-10 westbound off-ramp; and
- SR-177 and Kaiser Road.

Turning movements at these intersections are controlled by stop or yield signs, as appropriate. None of the intersections are signalized.

Existing Level of Service

LOS is a measure of congestion as experienced by motorists. LOS is generally described in terms of travel time and speed, freedom to maneuver, traffic interruptions, comfort, and convenience. The LOS applies quantifiable traffic measurements, such as intersection delays, to provide a qualitative assessment of motorists' perception of and satisfaction with traffic conditions. LOS is designated by the letters "A" through "F" with "A" for most favorable and "F" for least favorable, with each letter representing a range of conditions. For unsignalized intersections, LOS is reported for the vehicle movement controlled by a stop or yield sign (i.e., LOS is not reported for the intersection as a whole, or for vehicles that do not have to stop). LOS definitions for unsignalized intersections are provided in Table 3.18-2.

Table 3.18-2. Interrupted Traffic Flow Facilities Level of Service

LOS	Qualitative Delay	Quantitative Delay (seconds/vehicle)
A	Low control delay	≤ 10
B	Short traffic delays	> 10 and ≤ 20
C	Average traffic delays	> 20 and ≤ 35
D	Long traffic delays	> 35 and ≤ 55
E	Very long traffic delays	> 55 and ≤ 80
F	Extreme delays potentially affecting other traffic movements in the intersection	> 80

Source: RCTLMA 2003

The LOS of intersections and roadway segments in the project study area and the delay in seconds upon which the LOS calculation is based are presented in Table 3.18-3.

Table 3.18-3. Existing Level of Service and Delay at Project Intersections

AM Peak Hour	LOS[1]	Delay[2] (seconds)
SR-177 and I-10 Eastbound	A	9.0
SR-177 and I-10 Westbound	A	9.1
SR-177 and Kaiser Road	A	8.5
PM Peak Hour		
SR-177 and I-10 Eastbound	A	9.3
SR-177 and I-10 Westbound	A	9.7
SR-177 and Kaiser Road	A	8.8

1 - Includes traffic from construction of Desert Sunlight Solar Farm project.
2 - Includes delay from construction of Desert Sunlight Solar Farm project.
Source: HKA 2011, see Appendix H.

The DCAP includes the following policy regarding LOS:

> *"DCAP 6.2 Maintain the County's roadway Level of Service standards as described in the Level of Service section of the General Plan Circulation Element" (Riverside County 2003).*

LOS "C" or better is the County standard according to the Riverside County General Plan Circulation Element. LOS "D" or "E" may be acceptable on some types of roads when special circumstances exist (Riverside County 2003).

Airports and Airspace

There are no airports within the project study area. A landing strip owned by Kaiser Industries and associated with Eagle Mountain is airports within the project study area. A landing strip owned by Kaiser Industries and associated with Eagle Mountain is located 0.5 miles west of the proposed solar facility (Eagle Crest Energy Company 2008). It was not listed in a database of airports in the U.S. and is assumed to see little, if any, traffic (AirNav 2010).

The Desert Center Airport (FAA Identifier L64) was previously located approximately 5 miles northeast of Desert Center, California, south of SR-177 and immediately north of Alternative D. It was a public general aviation airport that saw little traffic. Recently, Riverside County sold the airport to a private firm, Chuckwalla Valley Associates, LLC. The 4,200-foot airport runway continues to operate as a private special-use airport (and includes a racetrack). The 4,200-foot runway is surrounded by an influence area that extends 1,750 feet from the runway in all directions (County of Riverside Planning Department Staff Report 2009).

The DCAP includes the following policy, which may require amendment due to the recent conversion of the airport from a public airport to a private special-use airport:

> *DCAP 3.1 To provide for the orderly development of Desert Center Airport and the surrounding area, comply with the Airport Land Use Compatibility Plan for Desert Center Airport as fully set forth in Appendix L and as summarized in Table 4, as well as any applicable policies related to airports in the Land Use, Circulation, Safety and Noise Elements of the Riverside County General Plan* (Riverside County 2003).

The nearest public airport is the Chiriaco Summit Airport, which is located 21.5 miles west-southwest of the proposed solar facility site, along I-10.

The proposed project and alternatives would overlap several low-level military flight paths (State of California 2000). The proposed project and alternatives would overlap a Department of Defense area where consultation with the military is required to ensure that construction does not interfere with low-level flight operations (BLM 2011).

Railways

There are no railways in the project study area. The nearest railway is the Eagle Mountain railroad, which runs north from I-10 to Eagle Mountain. The railroad may be used in the future to transport nonhazardous solid waste to the proposed Eagle Mountain Landfill (Riverside County 2003).

Bicycle Routes

There are no bicycle routes or facilities such as designated bicycle lanes on the roads discussed in this section (Riverside County 2003). No bicycles were observed during the traffic counts on February 17, 2010 (BLM 2011); however, it is likely that cyclists use area roads.

Public Transportation

Greyhound Bus service and potentially other commercial bus lines provide public transportation eastbound and westbound on I-10. There is no public transportation in Desert Center, on SR-177, or on Kaiser Road (Riverside County 2003).

Public Access

Public access refers to the legal rights of citizens to access public land for certain purposes without barriers or impediments. The affected environment related to public access includes recreational use of land by the public as well as other legal guarantees or limitations on access such as deeds, right-of-way, easements, leases, licenses, and permits.

The majority of the project study area is remote, vacant, and undeveloped with few apparent uses by the public. A review of 2011 aerial photographs revealed no obvious evidence of public use or land development within the project study area other than a small number of roads and transmission lines (Google Earth 2011). The roads in the project study area have been previously discussed in this section.

3.19 VISUAL RESOURCES

Visual resources refer to visual considerations in the physical environment. Visual resources analysis is a systematic process to logically assess visible change in the physical environment and the anticipated viewer response to that change. The visual resources section describes the existing landscape character and visual quality of the project study area, existing views of the proposed project and alternatives from various on-the-ground vantage points, the visual characteristics of the proposed project and alternatives, and the landscape changes that would be associated with the construction, operation, and decommissioning of the Desert Harvest Solar Project (DHSP) as seen from various vantage points. This section also describes the regulatory settings associated with the construction and operation of the proposed project or its alternatives with respect to visual resources in the project study area. A description of the visual resources in the project study area follows the discussion of applicable plans, policies, and regulations below. The project study area for visual resources encompasses all areas within the viewshed of the proposed project and alternatives that could be visually affected by construction, operation, and decommissioning of the DHSP.

3.19.1 Applicable Plans, Policies, and Regulations

Public agencies and planning policy establish visual resource management objectives in order to protect and enhance public scenic resources. Goals, objectives, policies, and implementation strategies and guidance are typically contained in resource management plans, comprehensive plans and elements, and local specific plans as described below.

California Desert Conservation Area

Covering more than 25 million acres, the geologically diverse California Desert Conservation Area (CDCA) includes sand dunes, canyons, dry lakes, mountain ranges, and wilderness areas. The project study area is within the CDCA, which was established, in part, to protect the area's scenic resources that are located adjacent to a population center. The BLM manages approximately 12 million acres in the CDCA. The CDCA Plan did not include BLM Visual Resource Management (VRM) classes. However, a BLM-authorized Visual Resource Inventory (VRI) covering portions of the Chuckwalla Valley was conducted in 2010 and includes the area of the proposed project and alternatives. The inventory results are described in Section 3.19.2 (Existing Conditions).

In the CDCA Plan, the location of the DHSP includes land that is mostly classified as Multiple-Use Class (MUC) M (Moderate Use) and some classified as MUC L (Limited Use). The BLM's CDCA Plan defines the classes as follows.

- Class L (Limited Use)—These lands are managed to protect sensitive, natural, scenic, ecological, and cultural resource values. They provide for generally lower-intensity, carefully controlled multiple uses that do not significantly diminish resource values.
- Class M (Moderate Use)—These lands are managed in a controlled balance between higher-intensity use and protection. A wide variety of uses such as mining, livestock grazing, recreation, energy, and the development of new utility facilities are allowed.

Federal Land Policy and Management Act

The Federal Land Policy and Management Act (FLPMA) mandates protection of scenic values. In order to meet its responsibility to maintain the scenic values of public lands, BLM developed a VRM System. BLM's VRM policy is set forth in Manual 8400-1 (BLM 1984), with guidance provided in handbooks H-8410-1 Visual Resource Inventory (BLM 1986a) and H-8431-1 Visual Resource Contrast Rating (BLM 1986b). Additional guidance is contained in BLM Washington Office Instruction Memorandum 2009-167, Application of the Visual Resource Management Program to Renewable Energy.

FLPMA requires coordination with local planning (Title II, Sec. 202 (b)(9)). Portions of projects on private land are subject to local planning.

Visual Resource Management System

The objective of the VRM System is to uphold the BLM's stewardship responsibilities to identify and manage the visual resources present on public lands as required by FLPMA and NEPA. The VRM System consists of three components: VRI, designation of VRM classes during the land use planning or plan amendment process, and Visual Resource Contrast Rating System (VRCR — which is discussed in Section 4.19.1, Environmental Consequences).

Visual Resource Inventory

The inventory stage involves identifying the visual resources of an area and assigning them to inventory classes using the BLM's VRI process. The process involves rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or observation points. A description of each inventory class is presented in Table 3.19-1. The process is described in greater detail in Appendix G-1 and Handbook H-8410-1, Visual Resource Inventory (BLM 1986a). A Scenic Quality Rating form for the project study area is presented in Appendix G-3.

Visual resource inventory classes are assigned through the inventory process. Class I is assigned to those areas where a management decision has been made previously to maintain a natural landscape. This includes areas such as national wilderness areas, the wild section of national wild and scenic rivers, and other congressionally and administratively designated areas where decisions have been made to preserve a natural landscape. Classes II, III, and IV are assigned based on a combination of scenic quality, sensitivity level, and distance zones. This is accomplished by combining the 3 overlays for scenic quality, sensitivity levels, and distance zones and using the guidelines shown in Illustration 11 to assign the proper class. The end product is a visual resource inventory class overlay as shown in Illustration 12. Inventory classes are informational in nature and provide the basis for considering visual values in the RMP process. They do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

Visual Resource Management Objectives

VRM objectives are established in resource management plans (RMP). VRM decisions consider visual values established by the VRI along with land use allocations, desired outcomes, and future desired conditions. The management classes may differ from inventory classes based on management priorities for land uses and compatibility with land use allocations.

For the project study area, an Interim VRM Class IV objective has been established. Interim visual management classes are established where a project is proposed and there are no RMP-approved VRM objectives. These classes are developed using the VRI process and must conform to the land use allocations set forth in the RMP covering the project area (the CDCA Plan for the DHSP).

The interim objectives serve as the baseline for plan conformance, while the underlying VRI remains the baseline for determining actual physical impacts on the visual resources of the area.

Table 3.19-1. Bureau of Land Management Visual Resource Management Class Descriptions

Class	Description
I	Objective: Preserve landscape character. This class provides for natural ecological changes but does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	Objective: Retain existing landscape character. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract a casual observer's attention. Any changes must repeat the basic elements of line, form, color, and texture found in the predominant natural features of the characteristic landscape.
III	Objective: Partially retain existing landscape character. The level of change to the characteristic landscape should be moderate (or lower). Management activities may attract attention but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	Objective: Provide for management activities that require major modification of the landscape character. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic landscape elements.

Source: BLM 1986a

Scenic Roadway Programs

After a review of applicable planning and management documents, no officially designated or eligible California Department of Transportation state scenic highways were identified in the project study area. Although there are no state-designated or state-eligible scenic highways, there is a county-eligible scenic highway in the project study area. I-10, a Riverside County-eligible scenic highway, passes through the Desert Center area, affording views of the contrasting desert and mountainous terrain (LSA Associates, Inc. 2000). The stark contrast between sparsely vegetated desert flat lands and rocky mountainous terrain is pronounced in the Desert Center area. The visual landscape seen from I-10 in the vicinity of Desert Center is described further in Section 3.19.2 (Existing Conditions).

Riverside County General Plan

The Riverside County General Plan's Land Use (LU) Element contains the following policies involving visual resources that are applicable to the project study area (Riverside County 2003).

- LU 4.1 requires that new developments be located and designed to visually enhance, not degrade, the character of the surrounding area. Consideration should be given to preserving natural features such as unique natural terrain, drainage ways, and native vegetation wherever possible, particularly where they provide continuity with more extensive regional systems.
- LU 13.1 preserves and protects outstanding scenic vistas and visual features for the enjoyment of the traveling public.

- LU 13.3 ensures that the design and appearance of new landscaping, structures, equipment, signs, or grading within designated and eligible state and county scenic highway corridors are compatible with the surrounding scenic setting or environment.
- LU 13.5 requires new or relocated electric or communication distribution lines, which would be visible from designated and eligible state and county scenic highways, to be placed underground.
- LU 13.8 seeks to avoid the blocking of public views by solid walls.
- LU 20.1 requires that structures be designed to maintain the environmental character in which they are located.
- LU 20.2 requires that development be designed to blend with undeveloped natural contours of the site and avoid an unvaried, unnatural, or manufactured appearance.
- LU 20.4 ensures that development does not adversely impact the open space and rural character of the surrounding area.

The Desert Center Area Plan (DCAP) contains the following policies involving visual resources that are applicable to the project study area (Riverside County 2003).

- DCAP 2.3 assures that the design of new land uses subject to discretionary review visually enhances, and does not degrade, the character of the Desert Center region.
- DCAP 5.1 requires that outdoor lighting use fixtures that minimize effects on the nighttime sky and wildlife habitat areas, except as necessary for security reasons.
- DCAP 9.1 protects the scenic highways within the DCAP from change that would diminish the aesthetic value of adjacent properties through adherence to the policies found in the Scenic Corridors sections of the General Plan Land Use, Multipurpose Open Space, and Circulation Elements.
- DCAP 9.2 supports the designation of I-10 as an eligible, and subsequently, official scenic highway, in accordance with the California State Scenic Highway Program.
- DCAP 10.1 encourages clustering of development for the preservation of contiguous open space.

3.19.2 Existing Conditions

Visual Resource Inventory for the Project Area

The inventory consists of a scenic quality evaluation, sensitivity level analysis, and delineation of distance zones. Based on these three factors, BLM-administered lands are placed into one of four VRI classes. These inventory classes represent the relative value of the visual resources and are described in Table 3.19-1 above. The VRI Class, along with the Multiple Use Classifications (MUCs) and associated allowable projects, are used to determine interim VRM class designations.

A VRI covering the Palm Springs/South Coast Field Office planning area was conducted in 2010 as a part of the BLM's Solar Programmatic EIS effort and includes portions of the Chuckwalla Valley and the project study area. The 2010 VRI is considered to be the baseline for visual resource effects analysis. The Scenic Quality Field Inventory sheet for the 2010 inventory is presented in Appendix G-3.

Scenic Quality

Scenic quality is a measure of the overall impression or appeal of an area created by the physical features of the landscape such as natural features (landforms, vegetation, water, color, adjacent scenery, and scarcity) and built features (roads, buildings, railroads, agricultural patterns, and utility lines). These features create the distinguishable form, line, color, and texture of the landscape composition that can be judged for scenic quality using criteria such as distinctiveness, contrast, variety, harmony, and balance. The scenic quality of the Chuckwalla Valley is characterized by a vast, low, gently rolling valley bottom; some variety of vegetation (one or two major types); no water; subtle color variations; and some color contrast in soil and vegetation. The majority of the central valley floor is not substantially influenced by built cultural features (structures) though private development does punctuate the valley's landscape. The DHSP site is also surrounded by the ridges of the Eagle Mountains to the west, Coxcomb Mountains to the east, and Chuckwalla Mountains to the south, which provide backdrops of visual interest. Therefore, the project study area received a Scenic Quality Classification of B.

Sensitivity Levels

Sensitivity levels are a measure of public concern for scenic quality. Public lands are assigned high, medium, or low sensitivity levels by analyzing the various indicators of public concern. Factors considered in a sensitivity level analysis include type of users, amount of use, public interest, adjacent land uses, special areas, and any other factors that include visual sensitivity issues. According to the VRI, the sensitivity level of the Chuckwalla Valley is influenced by high volumes of traffic on I-10, much of which is recreational in nature; modest recreational use; high public interest and special sensitivity imparted by the Congressional designation of the CDCA; encirclement by designated wilderness areas to the north, south, east, and west including JTNP to the west, north, and east; low amounts of traffic on secondary and BLM roads; energy corridors; and private land development. The BLM has received consistent feedback from the public that scenery is one of the most prized values of the CDCA. Congress also noted scenery as one of the values of the California Desert when the CDCA was established. Also, the project study area is surrounded by the scenic landscapes of JTNP (including the Joshua Tree Wilderness Area) and Chuckwalla Mountains Wilderness Area. While use levels in these areas are low, the remote and isolated character of the landscape and the access to unencumbered, panoramic views of the region are attributes that are highly valued by its users. As such, these users are likely to be highly sensitive to visual changes in adjacent landscapes that are visible from wilderness areas. As a result, the DHSP site received an overall high sensitivity level rating primarily due to high public interest, presence of special areas, and high volumes of traffic on I-10 with views to the DHSP site.

Distance Zones

Landscapes are subdivided into three distance zones based on relative visibility from travel routes or observation points. The three zones are foreground/middleground, background, and seldom seen. The foreground/middleground zone includes areas seen from highways, rivers, or other viewing locations that are less than three to five miles away. Areas beyond the foreground/middleground zone, but usually less than 15 miles away, are in the background zone. Areas not seen as foreground/middleground or background (i.e., hidden from view) are in the seldom seen zone. Distance zones are determined in the field by actually traveling along each route and

observing the area that can be viewed. The DHSP site is in the foreground/middleground distance zone for most viewer groups, which are described below under Setting. For recreational users in the surrounding wilderness areas, the DHSP-viewing distance zone would range from foreground/middleground to background depending on the location of the recreational users in the surrounding wilderness areas.

VRI Classification

Based on the combination of the scenic quality, sensitivity levels, and distance zones, the DHSP site in the northern Chuckwalla Valley was assigned a VRI Class II. The scenic quality, sensitivity levels, and distance zones are further described below under Setting.

VRM Classification

The VRI class, along with the project's consistency with the allowable uses in the associated MUCs, are used to assign an interim VRM class to the immediate site. BLM lands south of I-10 and northeast of Desert Center are designated MUC L. This designation is intended to protect sensitive, natural, scenic, ecological and cultural resource values. Public lands designated as Class L are managed to provide for generally lower intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. This class does allow for projects such as DHSP where a site by site analysis shows conformance with the overall MUC class objectives. BLM lands north of I-10 are designated MUC M. This designation is intended to provide for a controlled balance between higher intensity use and the protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. The immediate project area is assigned an interim visual management Class IV designation. As previously described, the Class IV management objective is:

> *Provide for management activities that require major modification of the landscape character. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic landscape elements.*

Note that this interim VRM class assignment applies only to this specific project footprint. Any other projects would need to be analyzed and assigned an interim VRM class on a case by case basis based on an analysis of their conformance with land use plan objectives. Also, as discussed in Chapter 4, the BLM will require that all relevant and reasonable mitigation measures be employed to reduce project contrast to moderate levels (commensurate with Class III VRM objectives), except for those specific project components and from those specific KOPs where it can be demonstrated that, even with mitigation, the project still has a high degree of contrast.

Regional Setting

The Chuckwalla Valley is a broad, predominantly natural appearing, enclosed landscape surrounded on most sides by dramatic mountain ranges, and includes scattered dry lakes and rolling sand dunes. The surrounding mountains offer dramatic relief to the landscape and contain more diverse vegetation. The mountains can be more than 1,000 feet higher than the valley floor. The

DHSP site is mostly bounded by ridgelines of the Eagle Mountains, Coxcomb Mountains, and Chuckwalla Mountains, except on the southeast and a small area on the southwest. The Joshua Tree Wilderness Area and Chuckwalla Mountains Wilderness Area are in these mountains.

The broad Chuckwalla Valley is generally flat with localized areas of erosion and gently rolling terrain. The landscape is horizontal with vast open space. The terrain has light brown to buff-colored soils and rock. The valley floor is smooth. Vegetation is rounded, clumpy, and mottled in form and follows the line of the terrain. Vegetation colors are tan, brown, green, and dark green. The texture of the vegetation is moderately coarse consisting of grasses, creosote bushes, and isolated clusters of palm trees. The primary source of permanent water is the Colorado River Aqueduct.

Clusters of buildings and structures are found along I-10 at Desert Center, Lake Tamarisk, and the landing field southwest of the Desert Lily Sanctuary. The former Kaiser iron ore mining facility, which also has clusters of mostly vacant housing, is northwest of Lake Tamarisk and the proposed project. Other dispersed development such as residences, utility poles, and substations also punctuate the landscape.

Residences at Lake Tamarisk and vehicles using the roadways are the primary sources of artificial light. One of the attractions for residents in less developed areas of the county is the brilliance of the nighttime sky on clear nights, unencumbered by lighting scattered over a large urban area. Residents also value certain wildlife that prefer habitat areas where there is little artificial lighting.

Project Viewshed

The project viewshed is defined as the areas and locations from which the proposed project and alternatives could be seen and encompasses much of the Chuckwalla Valley and portions of the surrounding mountains identified above. Delineation of the viewshed from the sites of the proposed project and alternatives must extend from the top elevation of all of the proposed facilities at the sites, expanded to 5.5 feet above the ground of the visible horizon. Mountains surrounding the DHSP site limit the viewshed to generally less than 15 miles from the project facilities. Consequently, the project study area is mostly bounded by ridgelines (of the Eagle Mountains, Coxcomb Mountains, and Chuckwalla Mountains), except on the southeast and a small area on the southwest. Figures 3.19-1A through 1C present viewshed maps for both low-profile and high-profile solar panels and for the transmission structures. However, these viewshed maps are based solely on terrain models that do not account for possible vegetation or structural screening.

Most scenic vistas involving the DHSP site are from viewpoints along I-10, along State Route (SR-) 177, in Desert Center and Lake Tamarisk, and from surrounding ridgelines in Joshua Tree Wilderness, though these locations are more difficult to access.

Viewer groups of the DHSP site include dispersed recreational users in the surrounding mountains and the valley floor; nearby residents in Lake Tamarisk; dispersed private land/visitor-serving businesses in Desert Center; and roadway traffic on Kaiser Road, SR-177, and I-10. The majority of views of the area of the proposed project and alternatives are from Lake Tamarisk and along SR-177 and I-10 on the valley floor. Views of the site from the valley floor are fairly horizontal because the valley floor is relatively flat. A higher angle of view of the site is available from the surrounding mountains and wilderness areas. Although limited by access and lack of trails or

facilities, backcountry recreationists do access the surrounding mountains and would be afforded elevated perspectives of the northern Chuckwalla Valley in general and the DHSP site as well.

The duration of views depends on the viewer group. Stationary viewer groups (such as those in nearby residences and visitor-serving businesses) and slow-moving viewer groups (such as certain dispersed recreational users) have more time to view the project site. Fast-moving viewer groups (such as motorists in roadway traffic) have less time to view the project site but the openness of the landscape can still afford extended view durations even for freeway (I-10) travelers. Due to the relatively undeveloped nature of the DHSP site, direct views of it are primarily influenced by topography because there are few obstructions (such as walls, buildings, and vegetation) capable of blocking them, though some grade-level views are obscured by roadside vegetation.

As discussed above under Scenic Roadway Programs, I-10 is a Riverside County-eligible scenic highway and runs past the Desert Center area, affording views of the contrasting desert and mountainous terrain. General panoramic vistas of high quality also exist from other roadways such as SR-177 and Kaiser Road. As discussed elsewhere in this EIS, traffic volumes are light on SR-177 and on Kaiser Road in the project study area. Peak hour volume on I-10 near the intersection with SR-177 is between 2,800 and 3,000 vehicles. Approximately 26,500 vehicles use I-10 daily.

Linear Viewpoint Analysis

In contrast to stationary views at specific Key Observation Points (KOPs), which are discussed later in this section, transient project views from roadways are variable and range from unobstructed to completely screened (typically by roadside vegetation or structures) as illustrated in Figure 3.19-2, which presents a linear viewpoint analysis of the solar facility alternatives (not including the gen-tie alternatives) from the three main roadways in the project area – Kaiser Road, SR-177, and I-10. As shown in Figure 3.19-2, the quality of solar facility are color coded and include views up to 90 degrees off the direction of travel. Project visibility is not considered when the angle of view exceeds 90 degrees off the direction of travel. The outer limits of the color coding indicate the point in that particular direction of travel where the solar facility first becomes noticeable in the greater field of view.

As shown in Figure 3.19-2, **Northbound Kaiser Road** provides 6 miles of potential solar facility views, which, at an average travel speed of 55 miles per hour (mph), are covered in 6.5 minutes. Of those 6 miles of potential solar facility visibility (theoretically visible if not screened from view), 0.6 mile of road (or 10 percent and shown in red on the map) has unobstructed views of the solar facility site and is traveled in slightly more than 1.5 minutes. Approximately 1.5 miles of road (or 25 percent and shown in orange on the map) have partially obstructed views of the solar facility site due to screening by intervening vegetation and are traveled in approximately one and a half minutes cumulatively (multiple road segments). Approximately 2.7 miles of road (or 45 percent and shown in yellow on the map) have only limited views of the solar facility site due to screening by intervening vegetation and are traveled in approximately three minutes cumulatively (multiple road segments). Approximately 1.2 miles of road (or 20 percent and shown in green on the map) are screened by intervening vegetation and, thus, have no view of the solar facility site and are traveled in 1.3 minutes. Thus, a substantial

portion (65 percent) of northbound Kaiser Road in the project study area has limited to no views of the solar facility site.

Southbound Kaiser Road provides 4.7 miles of potential solar facility views, which at an average travel speed of 55 mph are covered in 5 minutes. Of those 5 miles of potential solar facility visibility, all 5 miles of road (or 100 percent and shown in orange on the map) have only partially obstructed views of the solar facility site and are traveled in 5 minutes. Therefore, southbound Kaiser Road in the project study area is substantially exposed to the solar facility site with predominantly unobstructed views.

Northbound SR-177 provides 5.7 miles of potential solar facility views, which at an average travel speed of 55 mph are covered in 6.25 minutes. Of those 5.7 miles of potential solar facility visibility, approximately 1.8 miles of road (or 32 percent and shown in red on the map) have unobstructed views of the solar facility site, and are traveled in 2 minutes. Approximately 3.2 miles of road (or 56 percent and shown in yellow on the map) have only limited views of the solar facility site due to screening by intervening vegetation, and are traveled in 3.5 minutes. Approximately 0.7 mile of road (or 12 percent and shown in green on the map) is screened by intervening vegetation and thus, has no view of the solar facility site, and is travelled in 0.75 minute. Thus, a substantial portion of northbound SR-177 in the project study area has limited to no view of the solar facility site.

Southbound SR-177 provides approximately 3.2 miles of potential solar facility views, which at an average travel speed of 55 mph are covered in approximately 3.5 minutes. Of those 3.2 miles of potential solar facility visibility, 2.5 miles of road (or 78 percent and shown in yellow on the map) have only limited views of the solar facility site due to substantial screening by roadside vegetation, and are traveled in 2.7 minutes cumulatively (multiple road segments). Approximately 0.7 mile of road (or 22 percent and shown in green on the map) is screened by intervening vegetation and thus, has no view of the solar facility site, and is travelled in approximately 0.8 minute. Thus, southbound SR-177 in the project study area has limited to no views of the solar facility site.

Eastbound I-10 provides 9.5 miles of potential solar facility views, which at an average travel speed of 70 miles per hour (mph), are covered in 8 minutes. Of those 9.5 miles of potential solar facility visibility, 1 mile of road (or 10.5 percent) is screened by intervening vegetation (shown in green) and is traveled in 1 minute cumulatively (multiple road segments). Approximately 3 miles of road (or 31.5 percent) have partially obstructed views of the solar facility (shown in orange), and are covered in approximately 2.5 minutes cumulatively (multiple road segments). Approximately 5.5 miles of road (or 58 percent) have relatively unobstructed views of the solar facility site, (shown in red) and are traveled in 4.5 minutes. Thus, a substantial portion of eastbound I-10 in the project study area has unobstructed views of the solar facility site.

Westbound I-10 provides 9.3 miles of potential solar facility views, which at an average travel speed of 70 mph are covered in 8 minutes. Of those 9.3 miles of potential solar facility visibility (theoretically visible if not screened from view), 2.1 miles of road (or 23 percent and shown in yellow on the map) have only limited views of the solar facility site due to screening by intervening vegetation, and are traveled in 1.8 minutes cumulatively (multiple road segments). Approximately 7.2 miles of road (or 77 percent and shown in red on the map) have relatively unobstructed views of the solar facility site, and are traveled in 6.2 minutes cumulatively

(multiple road segments). Thus, a substantial portion of westbound I-10 in the project study area also has unobstructed views of the solar facility site.

Key Observation Points

In consultation with the National Park Service and BLM, eight representative Key Observation Points (KOPs) were established to assess the various factors that are considered in the evaluation of a landscape's existing visual resources. KOPs were generally selected to be representative of the most critical locations from which the proposed project and alternatives would be seen and include at-grade and elevated perspectives. KOPs were located based on their usefulness in evaluating existing landscapes and potential impacts on visual resources with various levels of sensitivity, in different terrain, and from various vantage points. KOP locations for the proposed project and alternatives include: (1) along major or significant travel corridors (I-10 and SR-177); (2) at nearby recreation areas (Joshua Tree Wilderness in JTNP); (3) in the vicinity of a nearby residential community (Lake Tamarisk); and (4) local roads (Rice Road). These locations provide representative examples of the existing landscape context and viewing conditions for the DHSP and are shown on Figure 3.19-3. While additional potential KOP locations are certainly available, the number and location of the eight selected KOPs are considered adequate to fully characterize the visual impact that will be experienced in the immediate DHSP vicinity and in the broader project area. Even though KOPs are generally not located on private property (as the view is typically applicable only to a much smaller viewing population), effort is made to ensure that publicly accessibly KOPs capture the residential impacts that would occur. Also, KOPs and simulations typically focus on long-term effects and not on short-term effects, such as those that would result during the relatively short construction period. At each KOP, the existing landscape was characterized and photographed. Photographs are presented as 11-inch by 17-inch color images at "life-size scale" when viewed at a standard reading/viewing distance of 18 inches (i.e., when the report image is held at a distance of 18 inches from the eye, all landscape features in the images would appear to be the same scale and size as they would appear in the field at the viewpoint location). Photographs are presented in Appendix A. A discussion of the existing visual setting for each KOP is presented in the following paragraphs, and a summary table is presented in Appendix G-2.

KOP 1 and 1A – Joshua Tree Wilderness at the northeast extent of the Eagle Mountains – Alternatives 4, 5, 6, and 7

KOP 1/1A (KOP 1 evaluates the low profile solar panels of Alternatives 4, 5, and 6 and KOP 1A at the same location evaluates the high profile solar panels of Alternative 7) was established in Joshua Tree Wilderness on a low ridge at the northeast extent of the Eagle Mountains, at the north end of Chuckwalla Valley (see Figure 4.19-1A). This KOP was requested by the National Park Service because of the relatively high use that this area receives for geological research. This KOP is also adjacent to an access point to the eastern Pinto Basin, which is popular for Night Sky enthusiasts. The view is considered representative of solar facility views from lower elevation vantagepoints within the national park and wilderness, which surround the proposed project on the west, north, and northeast (see Figures 3.19-1A and 3.19-3). It is also representative of the more distant lower elevation view opportunities on BLM lands in the northern portion of Chuckwalla Valley.

Viewing to the south, this panoramic vista encompasses the open expanse of the northern Chuckwalla Valley, backdropped by the Chuckwalla Mountains to the south and the Eagle Mountains to the west. This area includes a foreground/middleground flat desert landscape that supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of tans, browns, and muted greens. Although the rugged and visually interesting landforms of the Eagle and more distant Chuckwalla Mountains provide a backdrop of visual interest, the desert basin landscape is relatively non-descript and common to much of the Chuckwalla Valley. The applicable Scenic Quality Classification is C. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of Kaiser Road, SR-177 (Rice Road), the community of Lake Tamarisk, the Desert Lily Sanctuary ACEC, and Joshua Tree Wilderness in both the Eagle and Coxcomb mountains. The applicable interim VRM Class Rating is IV.

KOP 2 – Joshua Tree Wilderness along the western flank of the Coxcomb Mountains – Alternatives 4, 5, and 6

KOP 2 was established in Joshua Tree Wilderness along the western flank of the Coxcomb Mountains, approximately 3.5 miles northeast of the solar facility alternatives (see Figure 4.19-2A). This KOP was requested by the National Park Service because it would provide an elevated perspective of the solar facility alternatives that would be more typical of the elevated vantagepoints in the Joshua Tree Wilderness that surrounds the northern Chuckwalla Valley and elevated vantagepoints in Chuckwalla Wilderness to the south. Also, it would provide a more accurate assessment of the project's impacts on the wilderness values. This KOP location was chosen by the National Park Service as a location from which to prepare a time-lapse visual simulation of any glare or glint associated with the DHSP tracking panels while in motion from east to west.

Viewing to the southwest, this panoramic vista and elevated overlook of the northern Chuckwalla Valley also encompasses the Chuckwalla Mountains to the south and the Eagle Mountains to the west. This elevated view captures the variety of colors that are manifested in the soils, rocks, vegetation, and erosional patterns of the Chuckwalla Valley floor. The angular to low horizontal and rugged forms of the background Chuckwalla and Eagle Mountains provide features of additional visual interest. While some localized areas of ground disturbance are noticeable at this middleground viewing distance, they are not prominent features and the landscape is predominantly natural in appearance, though relatively non-descript and common to much of the Chuckwalla Valley. The applicable Scenic Quality Classification is C. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of Kaiser Road, SR-177 (Rice Road), the community of Lake Tamarisk, the Desert Lily Sanctuary ACEC, and Joshua Tree Wilderness in both the Eagle and Coxcomb Mountains. The applicable interim VRM Class Rating is IV.

KOP 3 – Kaiser Road in the Immediate Vicinity of the Solar Facility – Alternatives 4, 5, and 6

KOP 3 was established on Kaiser Road in the immediate solar facility vicinity, and is representative of views of the low-profile solar facility alternatives along both northbound and southbound Kaiser Road (see Figure 4.19-3A). Kaiser Road provides the principal access into the northern portion of Chuckwalla Valley and to Joshua Tree National Park and Wilderness, north of Chuckwalla Valley. There are numerous possible viewpoints with varying viewing distances to Alter-

native 4 along Kaiser Road — some providing distant viewing perspectives and some providing close proximity viewing perspectives. While it is understood that viewpoints closer to the solar facility will experience greater visual contrast, and viewpoints that are farther away from the project facilities will experience lesser visual contrast, KOP 3 was considered a reasonable compromise in viewpoint location along Kaiser Road. Viewing to the east, this view encompasses the open expanse of a central portion of the Chuckwalla Valley backdropped by the southern extent of the Coxcomb Mountains and the more distant Palen Mountains. This area includes a foreground/middleground flat desert landscape that supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of tans, browns, and muted greens. The rugged and visually interesting landforms of the nearby Coxcomb Mountains and more distant Palen Mountains provide a backdrop of visual interest. The applicable Scenic Quality Classification is B. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of Kaiser Road, SR-177 (Rice Road), the community of Lake Tamarisk, the Desert Lily Sanctuary ACEC, and Joshua Tree Wilderness in both the Eagle and Coxcomb mountains. The applicable interim VRM Class Rating is IV.

KOP 3A – Kaiser Road in the Immediate Vicinity of the Alternative 7 Solar Facility – Alternative 7

KOP 3A was established immediately adjacent to KOP 3 on Kaiser Road in the immediate vicinity of the Alternative 7 solar facility, but the view orientation is to the northeast instead of the east in order to better capture the setting for the high profile solar panels of Alternative 7. This location is representative of views of Alternative 7 along both northbound and southbound Kaiser Road in the vicinity of the Alternative 7 solar facility (see Figure 4.19-3C). Kaiser Road provides the principal access into the northern portion of Chuckwalla Valley and to Joshua Tree National Park and Wilderness, north of Chuckwalla Valley. There are numerous possible viewpoints with varying viewing distances to the solar facility along Kaiser Road — some providing distant viewing perspectives and some providing close proximity viewing perspectives, and as shown in the linear viewpoint analysis presented in Figure 3.19-2, visibility of the solar facility site can be quite variable depending on the presence or absence of intervening screening (vegetation, landforms, structures). While it is understood that viewpoints closer to the solar facility will experience greater visual contrast, and viewpoints that are farther away from the project facilities will experience lesser visual contrast, KOP 3A was considered a reasonable compromise in viewpoint location along Kaiser Road. Viewing to the northeast, this view encompasses the open expanse of a central portion of the Chuckwalla Valley backdropped by the Coxcomb Mountains and the more distant Palen Mountains (out of the frame of view to the right in Figure 4.19-3C). This area includes a foreground/middleground flat desert landscape that supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of tans, browns, and muted greens. The rugged and visually interesting landforms of the nearby Coxcomb Mountains provide a backdrop of visual interest. The applicable Scenic Quality Classification is B. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of Kaiser Road, SR-177 (Rice Road), the community of Lake Tamarisk, the Desert Lily Sanctuary ACEC, and Joshua Tree Wilderness in both the Eagle and Coxcomb mountains. The applicable interim VRM Class Rating is IV.

KOP 4 – Desert Lily Sanctuary ACEC – Alternatives 4, 5, 6, and E

KOP 4 was established near the western boundary of the Desert Lily Sanctuary ACEC, just east of SR-177, and is representative of views to the west from the ACEC toward the solar facility alternatives (see Figure 4.19-4A). The Desert Lily Sanctuary ACEC was selected for protection in 1968 because of its history of spectacular bloom displays, and for the protection of the desert lily. It was officially designated by Congress in 1994 as part of the California Desert Protection Act. It is a popular destination for the viewing of the desert lily bloom displays. Although there is very limited visibility of the low-profile solar facility alternatives from this location, the KOP is still valuable in that it is able to demonstrate the minimal visual impact (discussed below) that would be experienced by visitors to this important destination. This particular location is also valuable in that it can capture the visual impact of the closest gen-tie alternative to the ACEC (Alternative E). Viewing to the west, this view encompasses a central portion of the northern Chuckwalla Valley backdropped by the Eagle Mountains to the west. This area includes a foreground/middleground flat desert landscape that supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of tans, browns, and greens. Also visible is a wood-pole utility line. The rugged and visually interesting landforms of the Eagle Mountains provide a backdrop of visual interest. The applicable Scenic Quality Classification is B. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of Kaiser Road, SR-177 (Rice Road), the community of Lake Tamarisk, the Desert Lily Sanctuary ACEC, and Joshua Tree Wilderness in both the Eagle and Coxcomb mountains. The applicable interim VRM Class Rating is IV.

KOP 5 – Northbound Kaiser Road near Lake Tamarisk – Alternatives B and C

KOP 5 was established on northbound Kaiser Road, near the community of Lake Tamarisk, and is representative of views toward the Alternative B and C alignments from Kaiser Road and from the Lake Tamarisk community and golf course (see Figure 4.19-5A). As discussed above for KOP 3, there are numerous opportunities to view the transmission line along Kaiser Road. However, this particular location is effective in capturing the visual impact that would be experienced by multiple viewing populations including travelers on Kaiser Road, residents of the Lake Tamarisk community, and visitors to the Lake Tamarisk golf course. Viewing to the north-northwest, this view toward the open expanse of Chuckwalla Valley west of Kaiser Road and the Eagle Mountains beyond is partially obscured by roadside vegetation. This area includes a foreground/middleground flat desert landscape that supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of yellows, tans, browns, and greens. The rugged and visually interesting landforms of the Eagle Mountains provide a backdrop of visual interest. The applicable Scenic Quality Classification is B. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of I-10, Kaiser Road, SR-177 (Rice Road), the community of Lake Tamarisk, the Alligator Rock ACEC, and Joshua Tree Wilderness in the Eagle Mountains. The applicable interim VRM Class Rating is IV.

KOP 6 – Eastbound I-10 – Alternative D

KOP 6 was established on eastbound I-10, east of Desert Center, and approximately 0.8 mile west of the Alternative D route span of I-10. This view is representative of views toward the Alternative D alignment from I-10 (see Figure 4.19-6A). This particular location is effective in

capturing the visual impact of a transmission line convergence and span of I-10, the major travel corridor in the region. This KOP assessment is also applicable to the other transmission line alternatives, which would all approach and span I-10 in this same general area. The view to the northeast, toward the span location, captures a central portion of the northern Chuckwalla Valley, north of I-10. This open expanse of valley floor includes a foreground/middleground flat desert landscape that supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of muted yellows, tans, browns, and greens. The rugged and visually interesting landforms of the Palen Mountains provide a backdrop of visual interest. The applicable Scenic Quality Classification is B. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of I-10, Kaiser Road, SR-177 (Rice Road), the Desert Lily Sanctuary ACEC, and the Chuckwalla Mountains Wilderness. The applicable interim VRM Class Rating is IV.

KOP 7 – Northbound SR-177 – Alternative E

KOP 7 was established on northbound SR-177 (Rice Road), approximately 0.3 mile southwest of the Alternative E route span of SR-177, and is representative of views toward the Alternative E alignment from SR-177 (see Figure 4.19-7A). This KOP location was selected as a reasonable compromise of the viewing distances to the Alternative E transmission line available to travelers on SR-177. It is also a viewing distance that is fairly representational of the view of the transmission line from the Desert Lily Sanctuary ACEC, immediately north of the alignment. Viewing to the northwest toward the span location, captures a central portion of the northern Chuckwalla Valley where it is bisected by Kaiser Road. The open expanse of the valley floor is partially obscured by roadside vegetation. This area includes a foreground/middleground flat desert landscape that supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of yellows, tans, browns, and greens. The rugged and visually interesting landforms of the Coxcomb Mountains and more distant Palen Mountains provide a backdrop of visual interest. The applicable Scenic Quality Classification is B. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of I-10, Kaiser Road, SR-177 (Rice Road), the community of Lake Tamarisk, the Desert Lily Sanctuary ACEC, and Joshua Tree Wilderness in the Coxcomb Mountains. The applicable interim VRM Class Rating is IV.

KOP 8 – Westbound I-10 – Alternative E

KOP 8 was established on westbound I-10 immediately north of the approved Red Bluff Substation site, approximately 5.75 miles east of Desert Center, and approximately 0.2 mile east of the Alternative E route span of I-10. This view is representative of views toward the Alternative E alignment from I-10 (see Figure 4.19-8A). This KOP location was selected because it is effective in capturing the circuitous route of Alternative E across Chuckwalla Valley north of I-10. This route configuration results in the visibility of numerous transmission structures in a single field of view from I-10, thus, the importance of the KOP 8 location. This view to the north captures a central portion of the northern Chuckwalla Valley. The open expanse of the valley floor includes a foreground/middleground flat desert landscape that is generally natural appearing and supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of yellows, tans, browns, and greens. The rugged and visually interesting landforms of the Coxcomb Mountains and more distant Palen Mountains provide a backdrop of visual interest. The applicable Scenic Quality Classification is B. Viewer

Sensitivity is high because these lands are within the CDCA and are within the foreground/ middleground viewsheds of I-10, SR-177 (Rice Road), the Desert Lily Sanctuary ACEC, the Alligator Rock ACEC, and the Chuckwalla Mountains Wilderness. The applicable interim VRM Class Rating is IV.

KOP 8A – Westbound I-10 – Alternatives 7, B, and C

KOP 8A was established immediately adjacent to KOP 8 on westbound I-10 immediately north of the approved Red Bluff Substation site, approximately 5.75 miles east of Desert Center, and approximately 0.2 mile east of the Alternative E route span of I-10. However, the view orientation is to the northwest instead of the north (as for KOP 8) in order to better capture the setting for the high-profile solar facility of Alternative 7 and Alternatives B and C gen-tie routes, as viewed from westbound I-10. It is acknowledged that there are numerous possible viewpoints with varying viewing distances to the solar facility site along I-10 – all providing distant viewing perspectives and variable visibility depending on the presence or absence of intervening screening (vegetation, landforms, structures), as discussed above. While different viewpoints will experience greater or lesser visual contrast, KOP 8A was considered a reasonable compromise in viewpoint location along I-10. Additional discussion of the linear viewpoint analysis for I-10 is provided in section 4.19 below.

The view from KOP 8A is representative of views toward the Alternative 7 solar facility and Alternative B and C gen-tie routes from westbound I-10 (see Figure 4.19-8C). This KOP location was selected because it is effective in capturing both the solar facility and gen-tie north of I-10 in the same field of view. This view to the northwest captures a central portion of the northern Chuckwalla Valley. The open expanse of the valley floor includes a foreground/ middleground flat desert landscape that is generally natural appearing and supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of yellows, tans, browns, and greens. The rugged and visually interesting landforms of the Eagle and Coxcomb Mountains provide a backdrop of visual interest. The applicable Scenic Quality Classification is B. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of I-10, SR-177 (Rice Road), the Desert Lily Sanctuary ACEC, the Alligator Rock ACEC, and the Chuckwalla Mountains Wilderness. The applicable interim VRM Class Rating is IV.

KOP 9 – Joshua Tree Wilderness at the eastern-most extent of the Eagle Mountains – Alternatives 4, 5, 6, and 7

KOP 9 was established in Joshua Tree Wilderness at the eastern-most extent of the Eagle Mountains, approximately five miles west of the solar development area. The view orientation is to the east, toward the project site. The view from KOP 9 is representative of views toward the solar facility from lower elevation viewpoints in the Eagle Mountains (and Joshua Tree Wilderness) to the west. This KOP location was selected at the request of the National Park Service in order to prepare a time-lapse simulation of any glare or glint associated with the DHSP tracking panels while in motion from east to west. This view to the east captures a central portion of the northern Chuckwalla Valley. The open expanse of the valley floor includes a foreground/middleground flat desert landscape that is generally natural appearing and supports a sparse and irregular, to more uniform at distance, distribution of short grasses and shrubs of subdued color consisting of yellows, tans, browns, and greens. The rugged and visually

interesting landforms of the Coxcomb and Palen Mountains beyond provide a backdrop of visual interest. The applicable Scenic Quality Classification is B. Viewer Sensitivity is high because these lands are within the CDCA and are within the foreground/middleground viewsheds of I-10, SR-177 (Rice Road), the Desert Lily Sanctuary ACEC, the Alligator Rock ACEC, and the Chuckwalla Mountains Wilderness. The applicable interim VRM Class Rating is IV.

3.20 WATER RESOURCES

This section describes the existing hydrology and water quality conditions that could be affected by implementation of the Desert Harvest Solar Project (DHSP or Proposed Action or Project) and alternatives. The project study area for water resources encompasses all surface and ground-water resources that could be affected by construction, operation, and decommissioning of the Proposed Action.

3.20.1 Applicable Plans, Policies, and Regulations

Existing laws and regulations applicable to water resources in the project study area are described below. In some cases, compliance with these existing laws and regulations would serve to reduce or avoid certain impacts that might otherwise occur with the implementation of the project.

Federal

Clean Water Act

The Federal Water Pollution Control Act was passed in 1972, and was amended in 1977 as the Clean Water Act (CWA, 33 U.S.C. 1251-1376). The CWA was reauthorized in 1981, 1987, and 2000, and establishes the basic structure for regulating discharges of pollutants into the waters of the United States and has given the U.S. Environmental Protection Agency (EPA) the authority to implement pollution control programs. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface waters. Many pollutants are regulated under the CWA, including various toxic pollutants, total suspended solids, biological oxygen demand and pH (acidity/ alkalinity measure scale). Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process, described below under the "Section 402" discussion. The CWA generally applies to surface Waters of the United States, and the U.S. Army Corps of Engineers (USACE) has not formally determined whether any jurisdictional waters occur on the site of the Proposed Action or alternatives. However, based on previous USACE determinations that waters are not jurisdictional on the adjacent Desert Sunlight Solar Farm project, it is not expected that USACE will take jurisdiction for the Proposed Action and alternatives. Nevertheless, CWA requirements are set forth below.

Section 401

Section (§) 401 of the CWA requires the State (via the nine Regional Water Quality Control Boards [RWQCB]) to issue Water Quality Certifications (WQC) for licenses or permits issued for, among other things, the discharge of dredged or fill materials to federally jurisdictional waters, or Waters of the United States, which are located within the State. In order for a §401 WQC to be required, the activity causing the discharge must be authorized by a permit or license issued by a federal agency; federal licenses and permits most frequently subject to §401 include CWA §402 (NPDES) permits issued by EPA, CWA §404 (dredge and fill) permits issued by the USACE, Federal Energy Regulatory Commission (FERC) hydropower licenses, and Rivers and Harbors Act (RHA) §9 and §10 permits issued by the USACE (USEPA 2010).

Section 402

Section 402 of the CWA prohibits the discharge of pollutants (except for dredged or fill material, which is regulated under §404 of the CWA) from point sources to Waters of the United States, unless authorized under an NPDES permit issued by the United States Environmental Protection Agency (USEPA). In California, NPDES permitting authority is delegated by the USEPA to the State Water Resources Control Board (SWRCB) and administered by the nine RWQCBs. The project is within the jurisdiction of the Colorado River Basin RWQCB (Region 7).

Construction activities may comply with and be covered under the NPDES General Construction Storm Water Permit (Water Quality Order 99 08 DWQ) if the following requirements are met:

- Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices (BMPs) that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving offsite into receiving waters;
- Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the nation; and
- Perform inspections of all BMPs.

Projects that disturb one or more acres and would result in discharge(s) to Waters of the U.S. are required to obtain NPDES coverage under the Construction General Permits. Please see Section 3.3, Vegetation, and 3.4, Wildlife, for a discussion of jurisdictional waters in the project area.

Section 404

Section 404 establishes a permit program administered by the USACE, regulating the discharge of dredged or fill material into Waters of the U.S., including wetlands. Implementing regulations by USACE are found at 33 Code of Federal Regulations (CFR) Parts 320-330. Guidelines for implementation are referred to as the §404(b)(1) Guidelines and were developed by the USEPA in conjunction with USACE (40 CFR Parts 230). The Guidelines allow the discharge of dredged or fill material into the aquatic system only if there is no practicable alternative that would have less adverse impacts. A WQC pursuant to §401 of the CWA is required for §404 permit actions. If applicable, construction would also require a request for WQC or waiver thereof from the Colorado River Basin RWQCB.

Section 303(d)

Section 303(d) of the CWA (CWA, 33 USC 1250, et seq., at 1313(d)) requires states to identify "impaired" waterbodies as those which do not meet water quality standards. States are required to compile this information in a list and submit the list to the USEPA for review and approval. This list is known as the Section 303(d) list of impaired waters. As part of this listing process, states are required to prioritize waters and watersheds for future development of Total Maximum Daily Load (TMDL) requirements. The SWRCB and RWQCBs have ongoing efforts to monitor and assess water quality, to prepare the Section 303(d) list, and to develop TMDL requirements. The Salton Sea, 35 miles southwest of the DHSP, is listed by the Colorado River Basin Regional Water Quality Control Board under Section 303(d) as an impaired waterbody. No other impaired waterbodies exist in the project study area.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act (33 USC 401 et seq.) is administered by USACE, and requires permits in navigable waters of the U.S. for all structures such as riprap and activities such as dredging. Navigable waters are defined as those subject to the ebb and flow of the tide and susceptible to use in their natural condition or by reasonable improvements as means to transport interstate or foreign commerce. The USACE grants or denies permits based on the effects on navigation. Most activities covered under this act are also covered under §404 of the CWA. The USACE has not formally stated whether it will take jurisdiction over any waters within the footprint of the Proposed Action; however, USACE had not taken jurisdiction over any waters on the adjacent Desert Sunlight Solar Farm project site, as the watershed in the project study area drains into Palen Dry Lake, rather than to the Pacific Ocean.

Safe Drinking Water Act

This act was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources, which are rivers, lakes, reservoirs, springs, and groundwater wells. This act authorizes the USEPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. The act also mandates a groundwater/wellhead protection program be developed by each state in order to protect groundwater resources that are a source for public drinking water. In California, the California Department of Public Health (CDPH) administers the Drinking Water Source Assessment and Protection (DWSAP) Program, which addresses both surface water and groundwater resources; the groundwater portion of the DWSAP Program serves as the State's wellhead protection program (CDPH 2007). If a groundwater well is developed for the proposed DHSP, it would comply with the DWSAP Program for wellhead protection.

National Flood Insurance Program

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA), a component of the U.S. Department of Homeland Security. The NFIP is a federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. In support of the NFIP, FEMA identifies flood hazard areas throughout the U.S. and its territories by producing Flood Insurance Rate Maps (FIRM). FIRMs identify the estimated limits of the 100-year floodplain for mapped watercourses, among other flood hazards. A 100-year floodplain is defined as any land that would be inundated by a flood having a 1 percent chance of occurring in any given year (also referred to as the base flood). Participation in the NFIP is based on an agreement between communities and the federal government. The agreement states that if a community adopts and enforces a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, the federal government will make flood insurance available to the community. Flood hazards are discussed in Section 3.20.2, under "Surface Water Resources." The DHSP has been designated by FEMA as Flood Zone D meaning no flood hazard analysis has been conducted (FEMA 2011).

Executive Order 11988, Floodplain Management

This order directs all federal agencies to avoid the long-term and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Guidance provided per Executive Order 11988 addresses an eight-step process for agencies to determine how projects would have potential impacts to or within the floodplain; as described in this guidance, if a proposed action is located within the base floodplain (Step 1) where the "base floodplain" is the area which has a one percent or greater chance of flooding in any given year (also referred to as the "100-year Flood Zone" or "Flood Hazard Area"), agencies should conduct early public review (Step 2), identify and evaluate practicable alternatives to locating in the base floodplain (Step 3), identify impacts of the proposed action (Step 4), develop measures to minimize the impacts and restore and preserve the floodplain as appropriate (Step 5), reevaluate alternatives (Step 6), and present the findings and a public explanation (Step 7), with the final step being to implement the action (Step 8) (FEMA 2012). As described above under "National Flood Insurance Program," the DHSP area and surrounding vicinity are not identified by FEMA as being located within a base floodplain. However, the impact analysis provided in Section 4.20 of the Final EIS includes discussion of potential impacts associated with Flood Hazard Areas under correlating subheadings, and appropriate mitigation measures are also presented.

Colorado River Accounting Surface Rule

The Colorado River Accounting Surface Rule (Proposed Rule) was proposed by the U.S. Bureau of Reclamation (USBR) in the Federal Register on July 16, 2008 (43 CFR Part 415), as a means for tracking and allocating water use along the Colorado River, including in the vicinity of the DHSP.

USGS Report 2008-5113, *Update of the Accounting Surface Along the Lower Colorado River*, updated the location and extent of the Accounting Surface in support of the Proposed Rule. That USGS document includes a map which shows the Accounting Surface in Parker, Palo Verde, and Cibola Valleys and adjacent tributary areas in Arizona and California, including the DHSP area, and indicates that the project area is located within the areal extent of the river aquifer, and that the Accounting Surface within this aquifer is predicted to be at an elevation of between 238 and 242 feet above mean sea level (msl). The Accounting Surface is used to identify "water withdrawn from the mainstream by underground pumping" (547 U.S.150 (2006)) which will be replaced by surface water from the Colorado River. Groundwater produced from the mainstream needs to be accounted for as consumptive use of Colorado River water as required under the Consolidated Decree (547 U.S.150 (2006)), when the water table at production sites within the CVGB falls below the Accounting Surface (USGS 2008).

The Accounting Surface is defined as the elevation and slope of the static water table in the river aquifer that would exist if the water in the aquifer were derived only from the Colorado River. The river aquifer is defined as those saturated sediments that are hydraulically connected to the Colorado River and includes groundwater basins and tributary valleys that are adjacent to the river. The static water level, which is the measured elevation of the water table not affected by groundwater withdrawal, is used to determine whether a well is pumping water that would be replaced by Colorado River water. A static water level below the Accounting Surface is presumed to yield water that will be replaced by water from the Colorado River (43CFR 415.2(4)).

Groundwater wells with static water levels above the Accounting Surface are presumed to yield water that will be replaced by precipitation, mountain front recharge, or inflow from tributary valleys (tributary water). (USGS 2008)

State of California

California Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1967, Water Code Section 13000 et seq. regulates surface water and groundwater within California and assigns responsibility for implementing CWA §401 through §402 and §303(d). It established the SWRCB and divided the state into nine regions, each overseen by a RWQCB, and requires the SWRCB and the nine RWQCBs to adopt water quality criteria to protect State waters. Those criteria include the identification of beneficial uses, narrative and numerical water quality standards, and implementation procedures. The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of its daily implementation authority is delegated to the nine RWQCBs. Water quality criteria for the project study area are contained in the Water Quality Control Plan (Basin Plan) for the Colorado River Basin (Region 7), which was adopted in 1993. This plan sets water quality standards controlling the discharge of wastes to the State's waters and land.

Senate Bill 610

Senate Bill 610 (SB 610) was passed on January 1, 2002, amending California law to require detailed analysis of water supply availability for certain types of large development projects. The primary purpose of SB 610 is to improve the linkage between water and land use planning by ensuring greater communication between water providers and local planning agencies, and ensuring that land use decisions for certain large development projects are fully informed as to whether sufficient water supplies are available to meet project demands. SB 610 requires the preparation of a Water Supply Assessment (WSA) for a project that is subject to CEQA and meets certain requirements, as described below with regard to the project.

1. Is the proposed project subject to CEQA?

   California Water Code Section 10910(a) states that any city or county that determines that a project, as defined in Section 10912, is subject to CEQA shall comply with [Section 10910]. CEQA applies to projects requiring an issuance of a permit by a public agency, projects undertaken by a public agency, or projects funded by a public agency. The proposed DHSP requires issuance of permits by a public agency and is subject to CEQA.

2. Is the proposed project a "Project" under SB 610?

   California Water Code Section 10912(a) states that any proposed action which meets the definition of "project" under SB 610 is required to prepare a WSA to demonstrate whether sufficient water supplies are available to meet requirements of the proposed project under normal and drought conditions. SB 610 defines a "project" as any one of six different development types with certain water use requirements, as specified in the Water Code revised by SB 610. Each identified development type and associated water requirements are addressed below. Any mixed-use project which incorporates one of the six development types described below is also defined as a "project" under SB 610.

- *Residential Development*

  A proposed residential development of more than 500 dwelling units is defined as a "project" under SB 610. The proposed DHSP is not a residential development.

- *Shopping Center or Business Establishment*

  A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space is defined as a "project" under SB 610. The proposed DHSP is not a shopping center or residential development.

- *Commercial Office Building*

  A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space is defined as a "project" under SB 610. The proposed DHSP is not a commercial office building.

- *Hotel or Motel*

  A proposed hotel or motel, or both, having more than 500 rooms is defined as a "project" under SB 610. The proposed DHSP is not a hotel or motel.

- *Industrial, Manufacturing, or Processing Plant or Industrial Park*

  A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area is defined as a "project" under SB 610.

  The proposed DHSP is not a manufacturing plant, processing plant, or industrial park. The language of SB 610 is not clear on whether renewable energy projects such as the proposed DHSP should be considered an "industrial plant." If the proposed DHSP is considered to be an industrial plant, it should also be considered a "project" under SB 610 because it would occupy more than 40 acres of land. The passing of SB 267 on October 11, 2011 clarified that renewable energy projects are subject to the requirements of SB 610 by amending California Water Law to revise the definition of "project" specified in SB 610. Under SB 267, wind and photovoltaic projects which consume less than 75 acre-feet per year (afy) of water are not considered to be a "project" under SB 610; subsequently, a WSA would not be required for this type of project. Construction of the DHSP would require 400.51 to 500.51 afy of water over the 24-month construction period, while operation of the project would require 26.02 to 39.02 afy. Due to the construction water requirements, the DHSP is considered a "project" per SB 610, as clarified by SB 267. Therefore, a WSA has been prepared to satisfy the requirements of SB 610.

3. Is there a public water system that will service the proposed project?

   United States Code Title 42 Section 300f(4) describes that the term "public water system" refers to a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves at least twenty five individuals (42 U.S.C. Sec. 300f(4)). The proposed DHSP would not be serviced by a public water system. As described in Section 2,

water required during construction and operation of the DHSP would be obtained from groundwater well(s) located on- and/or off-site, and would pump water from the CVGB.

4. Is there a current UWMP that accounts for the project demand?

   There are a number of Urban Water Management Plans (UWMPs) in Riverside County, including the following: City of Riverside UWMP, Coachella Valley Water District UWMP, Desert Water Agency UWMP, Eastern Municipal Water District UWMP, Riverside Highland Water Company UWMP, and Western Municipal Water District UWMP. These plans do not address the DHSP site; there is no current UWMP that accounts for the project demand.

5. Is groundwater a component of the supplies for the project?

   Yes, water supply requirements for the proposed DHSP are currently expected to be met using water pumped from the CVGB. During the 24-month construction period for the DHSP, 400.51 to 500.51 afy of water would be used for fugitive dust control and concrete batching, for a total construction water demand of 801.02 to 1,001.02 acre-feet. Local groundwater would also be used to meet the project's operational water requirements of 26.02 to 39.02 afy for panel washing and use at the O&M building. As previously described, the project's water supply would be pumped from the CVGB.

As described above, further revisions to California Water Code resulting from Senate Bill 267 (discussed below) clarify that certain renewable energy projects are subject to the requirements of SB 610. A WSA has been prepared for the proposed DHSP in compliance with SB 610, and is provided as Appendix E to this EIS.

Senate Bill 267

Senate Bill 267 (SB 267) was signed into law by California's Governor Brown on October 8, 2011, amending California's Water Law to revise the definition of "Project" specified in SB 610, as discussed above. Under SB 267, wind and photovoltaic projects which consume less than 75 afy of water are not considered to be a "Project" under SB 610; subsequently, a WSA would not be required for this type of project. SB 267 does not state that renewable energy projects which use more than 75 afy are subject to SB 610 and must prepare a WSA; rather, it clarifies that those renewable projects which use less than 75 afy are not subject to such requirements. SB 267 also does not state that the 75-afy threshold cannot be interpreted to mean the average annual water usage over the lifetime of a project; however, for the purposes of the analysis presented in this EIS, the most literal interpretation of SB 267 is utilized and it is therefore assumed that the 75-afy threshold refers to the quantity of water consumed during any 12-month period of a project. As noted above, the DHSP would require 400 to 500 afy of water over the 24-month construction period (total construction water requirement of 800 to 1,000 acre-feet). Therefore, the DHSP is considered subject to the requirements of SB 610 per SB 267, and a WSA has been prepared for the project and is included as Appendix E to this EIS.

California Water Code Section 1200, Water Rights

The law in California requires that water be identified as one of three categories: surface water, percolating groundwater, or "subterranean streams that flow through known and definite channels." Only surface water and subterranean stream water are within the permitting jurisdiction of

the SWRCB. Appropriation of those waters requires a SWRCB permit, and is subject to various permit conditions.

Water subject to appropriation is defined in Water Code Section 1201 as "all water flowing in any natural channel," except water that is or may be needed for use upon riparian land or water that is otherwise appropriated. The SWRCB's authority over groundwater extends only to the water in un-appropriated subterranean streams that flow through known or defined channels, except as it is or may reasonably be needed for useful and beneficial purposes upon lands riparian to the channel through which it is flowing.

"Percolating groundwater" has two sub-classifications: overlying land use, and surplus groundwater. Land owners overlying percolating groundwater may use the water on an equal basis and share a right to reasonable use of the groundwater aquifer. In this right, a land owner cannot consume unlimited quantities of underlying groundwater without regard to the needs of other users. Surplus groundwater may be appropriated for use on non-overlying lands, provided such use will not create an overdraft condition.

California Fish and Game Code, Sections 1601 – 1603

Under Sections 1601 to 1603 of the California Fish and Game Code, the Applicant is required to notify the CDFG prior to constructing any project that would divert, obstruct or change the natural flow, bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review generally occur during the environmental process. When an existing fish or wildlife resource may be substantially adversely affected, CDFG is required to propose reasonable project changes to protect the resource. These modifications are formalized in a Streambed Alteration Agreement that becomes part of the plans, specifications, and bid documents for the project.

State Water Resources Control Board Resolution 88-63

On May 19, 1988, the SWRCB adopted a policy entitled "Sources of Drinking Water," which was later revised by Resolution No. 2006-0008. The purpose of this resolution is to provide sufficient detail for incorporation into the applicable Basin Plan to facilitate the clear judgment of what is or is not a source of drinking water for various purposes. All surface and ground waters of the State are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the RWQCBs with the exception of surface and ground waters where one of the following conditions exists:

- The Total Dissolved Solids (TDS) exceed 3,000 milligram per liter (mg/L) (5,000 micro-Siemens per centimeter (µS/cm), electrical conductivity) and it is not reasonably expected by RWQCB to supply a public water system;
- There is contamination, either by natural processes or by human activity (unrelated to the specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices; and/or
- The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

Groundwater Protection Areas and Wellhead Protection

The overall concept behind wellhead protection is to develop a reasonable distance between point sources of pollution and public drinking water wells so that releases from point sources are unlikely to impact groundwater from the well. The California Department of Public Health (CDPH) established the Drinking Water Source Assessment and Protection Program, which guides local agencies in protecting surface water and groundwater that are sources of drinking water. The California Department of Pesticide Regulation's Groundwater Protection Program is charged with identifying areas sensitive to pesticide contamination and develops mitigation measures and regulations to prevent pesticide movement into groundwater systems.

Regional and Local Regulations

County of Riverside

- The Desert Center Area Plan within the County of Riverside General Plan aims to preserve the natural character of the unincorporated areas of Riverside County and Desert Center. As relevant to water resources and the preservation of natural drainage patterns, the plan encourages clustering of development for the preservation of contiguous open space, and aims to limit off-road vehicle use.
- The Riverside County Flood Control and Water Conservation District is the regional flood management authority for the western part of Riverside County. The responsibility for the eastern part of the County is borne by a combination of the County Transportation Department, the Coachella Valley Water District, and the various cities and a variety of local entities.

Riverside County Floodplain Management Ordinance 458

Riverside County is a participating community in the NFIP (discussed above) and is therefore required by FEMA to adopt a floodplain management ordinance in order to make the purchase of flood insurance available to citizens of the county. The intent of this ordinance is to ensure that any new construction and/or substantial improvement within a mapped floodplain is done in a manner that reduces damage to the public and property, as well as to discourage new development within floodways. The Floodplain Management (FPM) Section of the District is responsible for the implementation of the County's Floodplain Management regulation and portions of the NFEP regulations. (RCFCWCD 2011)

In accordance with Ordinance 458, Section 4 (Administration), no structure shall be constructed, located, or substantially improved and no land shall be graded, filled, or developed, and no permit or approval shall be granted therefore, unless it complies with all applicable requirements of the ordinance. As relevant to the proposed DHSP, per Section 6 (Construction Standards) of Ordinance 458, proposed developments within a mapped floodplain area must meet the following criteria: be designed or modified and adequately anchored to prevent flotation, collapse, or lateral movement of the structure; be constructed with materials resistant to flood damage; be constructed by methods and practices that minimize flood damages; and be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

Riverside Code Section 13.20 (Ordinance 682): Construction, Reconstruction, Abandonment and Destruction of Wells

This ordinance provides minimum standards for construction, reconstruction, abandonment, and destruction of all wells. Permits shall be issued after compliance with the standards provided and incorporated by reference in this ordinance. Plans shall be submitted to the Riverside County Department of Environmental Health demonstrating compliance with such standards.

Standards for the construction, reconstruction, abandonment, or destruction of wells shall be the standards recommended in the Bulletins of the California Department of Water Resources (DWR) as follows: Bulletin No. 74-81 Chapter II Water Wells, and Bulletin No. 74-90 (Supplement to Bulletin No. 74-81) and as these Bulletins may be amended by the State of California from time to time.

Water from all new, repaired, and reconstructed community water supply wells, shall be tested for and meet the standards for constituents required in the California Code of Regulations, Title 22, Domestic Water Quality and Monitoring.

3.20.2 Water Resources Existing Conditions

The DHSP is located in eastern Riverside County, adjacent to the southern edge of the Desert Sunlight Solar Farm project and north of the community of Desert Center, in the Chuckwalla Valley. The Chuckwalla Valley basin generally trends northwest to southeast and is surrounded by relatively impervious bedrock mountain exposures. These ranges include the Chuckwalla and Little Chuckwalla Mountains to the south, the Eagle and Coxcomb Mountains to the west-northwest, the Granite, Palen, and Little Maria Mountains to the north, with the McCoy and Mule Mountains to the east. The Coxcomb and Palen Mountains extend into the valley from the north. Elevations range from about 400 feet above msl in the eastern part of the valley to more than 5,000 feet above msl in the mountains.

Climate in the Chuckwalla Valley is characterized by high aridity and low precipitation, with hot summer months characterized by average maximum temperature of 108 degrees Fahrenheit (ºF) in July and cold dry winters characterized by average minimum temperature of 66.7 ºF in December. Average annual precipitation in the area (based on the gauging stations at Blythe Airport and Eagle Mountain) is 3.6 to 3.7 inches, with August recording the highest monthly average of 0.64 inches and June recording the lowest monthly average of 0.02 inches. Most moisture from precipitation is lost through evaporation and evapotranspiration (Colorado River Basin RWQCB 2006b). Most rainfall occurs during the winter months or in association with summer storms, which tend to be of shorter duration and higher intensity than winter storms. (BLM 2011a)

The California Interagency Watershed Mapping Committee (CIWMC) has developed a system for naming and delineating watersheds and subunits in California, beginning with 10 Hydrologic Regions (HR) that each cover millions of acres, and which are progressively subdivided into Hydrologic Units (HU) and Hydrologic Areas (HA). The DHSP is located in the Colorado HR, and is within the Chuckwalla HU, and entirely within the Palen HA subdivision of the Chuckwalla HU. The Chuckwalla HU encompasses 1,268,650 acres, and the Palen HA accounts for 419,660 of these acres, or 33 percent of the larger HU.

For planning and reporting purposes, the Basin Plan also divides the Colorado River Basin region into seven major planning areas (Colorado River Basin 2006b). The DHSP site is located within the Hayfield Planning Area, which lies primarily in Riverside County and covers 1,860 square miles, or 1,190,400 acres (Colorado River Basin 2006b). The Hayfield Planning Area is discussed throughout this section as relevant to environmental baseline conditions.

Environmental baseline conditions for water resources also considers the Desert Sunlight Solar Farm project, which is located adjacent to the northern edge of DHSP, because construction of the solar field associated with the Desert Sunlight Solar Farm project was under way at the time of the commencement of analysis for this EIS in September 2011. The Desert Sunlight Solar Farm project is discussed as applicable throughout this section and in the impact analysis presented in Section 4.20 of this EIS.

Surface Water Resources

For the purposes of this analysis, the study area for surface water resources is defined as the Chuckwalla HU. Figure 3.20-1 (Surface Water Resources Study Area: Chuckwalla Hydrologic Unit) shows the entire area encompassed by the Chuckwalla HU and identifies adjacent HUs, including the following (clockwise from the north): Cadiz HU, Ward HU, Rice HU, Colorado HU, Imperial HU, East Salton HU, Hayfield HU, Whitewater HU, Joshua Tree HU, Dale HU, and Route Sixty Six HU. Water resources located outside of the Chuckwalla HU are mentioned and/or discussed as relevant to context and the surrounding environment for the proposed DHSP; for instance, the Colorado River is shown on Figure 3.20-1 to the east of the proposed DHSP site. The Chuckwalla HU is considered an appropriate extent of analysis because this area encompasses surface water resources that could reasonably be affected by the DHSP. Potential impacts to the Colorado River and other surface water resources are discussed in Section 4.20.

Surface water resources in the DHSP area are primarily characterized as ephemeral desert washes with no water during most of the year. Figure 3.20-2 (Surface Water Features on the Project Site) shows site-specific water resources, characterized by streams and washes which traverse the proposed DHSP site, primarily in a northwest-to-southeast direction. These desert washes are typically sandy or rocky bed streams lined on the sides with desert riparian vegetation. The washes can be very numerous, braiding across the alluvial plains downstream of source areas. Adjacent washes on these alluvial "fans" may all have the same mountain source, with flow from the mountains potentially entering many channels that run adjacent to each other. Flow in these alluvial plain washes is typically heavily laden with sediment, and erosion of the wash banks and shifting of channel beds is common. The desert valleys are generally wide and flat, with watercourses, particularly in areas with large drainage areas, being hundreds of feet wide. Flows on these washes are very shallow, although there are generally one or more incised channels. Channel bed material and sides in the valley bottoms can be very fine silts and clays, with potential for erosion during very large flows in the incised channels.

There are no surface water flow outlets from the Chuckwalla Valley, which is internally drained; desert washes in the valley either terminate in localized groundwater sinks or flow to one of the two playas located within the basin — Palen Dry Lake and Ford Dry Lake, which are discussed below. Figure 3.20-2 shows numerous drainages in the project area, including twelve which traverse the DHSP site. There are no perennial (year-round) streams in Chuckwalla Valley (DWR

2004a) or in the Hayfield Planning Area (Colorado River Basin RWQCB 2006b). Perennial water resources, or those that exist year-round, in the surrounding area are limited to the Colorado River, 48 miles to the east of the DHSP, and the Salton Sea, 35 miles southwest of the project, as shown on Figure 3.20-1. There is no surface water connection between resources within the Chuckwalla HU and the Colorado River or the Salton Sea; however, as described below under "Groundwater Resources," groundwater underlying the proposed DHSP site is understood to be hydrologically connected to the Colorado River through groundwater flow.

As mentioned, there are two playas within the Chuckwalla Valley HU, Palen Dry Lake and Ford Dry Lake. Playas are shallow, centrally located basins or depressions where water gathers after a rain but evaporates or percolates into the subsurface quickly. Palen Dry Lake is located 8 miles east of the DHSP site, within the Palen HA. Palen Dry Lake is a wet playa, with shallow groundwater discharge due to evaporation. Palen Dry Lake is 3 miles wide and 2 miles long. Ford Dry Lake is located 19 miles southeast of the project site, within the Ford HA. Ford Lake is a "dry playa," with groundwater occurring well below the ground surface. Ford Dry Lake is 2 miles wide and 7 miles long.

As described in Section 3.20.1 under "National Flood Insurance Program," 100-year floodplains are geographic areas that would be inundated by a flood having a 1 percent chance of occurring in any given year, as reflected on FEMA-prepared FIRMs. The DHSP area is reflected on FIRM 06065C1800G, which is designated by FEMA as Flood Zone D, or areas with "possible but undetermined flood hazards," where no flood hazard analysis has been conducted (FEMA 2011). A Zone D designation does not mean that flood hazards do not exist in the area, but rather that the area has not been mapped for flood hazards. FIRM 06065CIND2A (Sheet 2 of 2), which is the index map for Riverside County, indicates that the FIRMs surrounding the project area are also designated as Zone D.

The DHSP site is located within an "Awareness Floodplain" mapped by the DWR as part of the Awareness Floodplain Mapping (AFM) project (DWR 2011b). The purpose of the AFM project is to identify pertinent flood hazard areas that are not mapped under FEMA's NFIP, such as the proposed DHSP site. These areas are indicated on Awareness Maps which show flood-prone areas, without specific depth of flood flows or other flood hazard data such as indicated on FEMA's FIRMs. Awareness Floodplain areas are also addressed in the Riverside County's Floodplain Management Ordinance 458 (described in Section 3.20.1 under "Regional and Local Regulations"), which is intended to protect public health and safety by regulating development in floodplains.

A *Preliminary Flood Plain & Hydrology Analysis* prepared for the Eagle Mountain Area, including the DHSP site, was conducted to characterize the depth and velocity of surface flows that would occur in response to a 100-year magnitude storm that occurs over a duration of 24 hours. This analysis utilized a synthetic unit hydrograph to model natural drainage courses, including consideration of the geometric data for a series of cross sections within each drainage reach. The 100-year peak flow was routed through the modeled system to determine water surface elevations. This analysis determined that surface water flows resulting from a 100-year storm event in the project area can exceed 1,800 cubic feet per second. The analysis also determined that due to the numerous small drainage channels in the area, 100-year storm flows would be distributed, with flow depths up to about 3 to 5 feet. (PHB & Associates 2009)

As stated above, the first phase of construction conditions of the Desert Sunlight Solar Farm project are considered part of the environmental baseline conditions for water resources. Implementation of the Desert Sunlight Solar Farm project has included construction of an earthen berm and fence along a portion of the southern boundary of that project site, which is also the northern boundary of the DHSP site. The berm surrounds a water storage and evaporation pond on the Desert Sunlight site, both of which will be removed following construction of the Desert Sunlight project; the berm is not anticipated to interfere with surface water flows onto the DHSP site.

Jurisdictional Delineations

Jurisdictional delineations are discussed in detail in Sections 3.3 (Biological Resources – Vegetation) and 3.4 (Biological Resources – Wildlife). Biological resources surveys were conducted within the DHSP area between January and October of 2011. A Biological Resources Technical Report (BRTR) (Appendix C) incorporates the results of all field surveys and literature reviews conducted for the DHSP to characterize the biological resources, including jurisdictional drainages that could be directly or indirectly impacted by implementation of the DHSP.

The CDFG regulates alterations to state-jurisdictional streambeds under Section 1600 et seq. of the California Fish and Game Code. Jurisdictional acreage is interpreted as the bed and banks of channels and adjacent riparian vegetation. In the Chuckwalla Valley area, the Blue Palo Verde–Ironwood Woodland (described in Section 3.3) is the regional riparian vegetation type. Due to the abundance and close spacing of braided channels throughout the area, all mapped Blue Palo Verde–Ironwood Woodland is adjacent to one or more channels. Aspen has calculated the total acreage of state-jurisdictional streambeds and adjacent riparian habitat as 180 acres within the proposed solar facility site. Figure 3.3-3 (CDFG Jurisdictional Streambeds) portrays state-jurisdictional drainages of varying widths.

Surface Water Quality

As discussed in Section 3.20.1, under the discussion of the CWA Section 303(d), states are required to identify "impaired" waterbodies as those which do not meet water quality standards, as defined in the Basin Plan for each RWQCB. No surface waters in the DHSP area are listed as impaired on the 2006 CWA Section 303(d) List of Water Quality Limited Segments for the Colorado River Basin Region (Colorado River Basin RWQCB 2006a).

Also as described in Section 3.20.1, the DHSP is located within the jurisdiction of the Colorado River Basin RWQCB and is subject to management direction of the Basin Plan for the Colorado River Basin Region. The Basin Plan defines water quality criteria for the project area and sets water quality standards controlling the discharge of wastes to the State's waters and land. Beneficial uses for surface waters are identified for eastern and western portions of the Colorado River Basin, as opposed to the individual Planning Areas. Those surface waters relevant to the project area are listed below in Table 3.20-1, with associated beneficial uses.

Table 3.20-1. Beneficial Uses of Surface Waters in the Project Area and Vicinity

	Beneficial Use Designation[1, 2]												
Surface Water Feature	MUN	AGR	AQUA	FRSH	IND	GWR	REC I	REC II	WARM	COLD	WILD	POW	RARE
Unlisted Perennial and Intermittent Streams	P[3]			I,X[4]		I,X	I,P,X	I,X	I,X		I,X		I,X[5]
Washes[6] (Ephemeral Streams)				I[4]		I		I	[7]		I		
Unlisted Springs						X	X,P	X,P	X[8]		X		X[5]
Salton Sea			X		P		X	X	X		X		X

1 - MUN: Municipal and Domestic Supply; AGR: Agriculture Supply; AQUA: Aquaculture; FRSH: Freshwater Replenishment; IND: Industrial Service Supply; GWR: Groundwater Recharge; REC I: Water Contact Recreation; REC II: Non-Contact Water Recreation; WARM: Warm Freshwater Habitat; COLD: Cold Freshwater Habitat; WILD: Wildlife Habitat; POW: Hydropower Generation; RARE: Preservation of Rare, Threatened, or Endangered Species.

2 - Listing of the beneficial uses is indicated by X for existing uses, P for potential uses, and I for intermittent uses.

3 - Potential use designations will be determined on a case-by-case basis as necessary in accordance with the "Sources of Drinking Water Policy" in the Basin Plan.

4 - Applies only to tributaries to Salton Sea.

5 - Rare, endangered, or threatened wildlife exists in or utilizes some of these waterway(s). If the RARE beneficial use may be affected by a water quality control decision, responsibility for substantiation of the existence of rare, endangered, or threatened species on a case-by-case basis is upon the California Department of Fish and Game on its own initiative and/or at the request of the Regional Board; and such substantiation must be provided within a reasonable time frame as approved by the Regional Board.

6 - Including the section of ephemeral flow in the Whitewater River Storm Water Channel and Coachella Valley Storm Water Channel from Indian Avenue to approximately 1/4 mile west of Monroe Street crossing.

7 - Use, if any, to be determined on a case-by-case basis.

8 - Section of perennial flow from Indio to the Salton Sea.

Source: Colorado River Basin RWQCB 2006b.

Construction, operation and maintenance, and decommissioning of the DHSP are expected to be consistent with all beneficial uses and water quality criteria defined in the Basin Plan. Potential impacts associated with water quality are discussed in Section 4.20 of this EIS.

Groundwater Resources

This section includes definitions and discussion of technical terms where necessary to facilitate the understanding of groundwater resources in the DHSP area.

The project site overlies the Chuckwalla Valley Groundwater Basin (CVGB), which is identified as the study area for groundwater resources for the purposes of this analysis. This is an appropriate study area because it encompasses the groundwater resources that could reasonably be affected by the DHSP. Figure 3.20-4 (Extent of Groundwater Basin at Project Site) shows that the proposed DHSP site is completely within the CVGB, as well as the gen-tie line alternatives and the Red Bluff Substation. The CVGB has a surface area of approximately 940 square miles, or about 604,000 acres (DWR 2004a). This basin is bounded by crystalline bedrock with relatively little porosity or permeability except in fractures (DWR 2004a). The presence of seismic faults is considered likely in some parts of the CVGB, but no barriers to groundwater flow have been identified (DWR 2004a).

The entire area encompassed by the CVGB is shown on Figure 3.20-3 (Groundwater Resources Study Area: Chuckwalla Valley Groundwater Basin), as well as surrounding basins, which include the following (clockwise, from the north): Ward Valley Groundwater Basin, Rice Valley Groundwater Basin, Palo Verde Mesa Groundwater Basin, Arroyo Seco Valley Groundwater Basin, Chocolate Valley Groundwater Basin, Orocopia Valley Groundwater Basin, Pinto Valley

Groundwater Basin, and Cadiz Valley Groundwater Basin. It is important to note that although these groundwater basins appear to be located adjacent to the CVGB, they are largely separated by hydrologic divides which inhibit the movement of groundwater between basins; the hydrologic connectivity of the CVGB with other basins in the area is discussed below, under "Recharge and Connectivity."

The DWR identifies the CVGB as Basin 7-5, as detailed in California's Groundwater Bulletin 118 (California DWR 2003). Bulletin 118 is a comprehensive report on the condition of groundwater throughout California, and provides guidance and direction for agencies responsible for managing groundwater resources. Per the latest update of Bulletin 118 for this region, not enough information is available to provide a quantitative assessment of the CVGB water budget (discussed in detail below, under "Safe Yield and Water Budget").

Groundwater resources in the Chuckwalla Valley are not adjudicated, which means that overlying land owners may use the groundwater on an "equal and correlative" basis, such that all property owners above a common aquifer possess a shared right to reasonable use of the aquifer, and a user cannot take unlimited quantities without regard to the needs of other users (BLM 2001). Surplus groundwater may be appropriated for use on non-overlying lands, provided such use will not create overdraft conditions; permits are not required for the use of underlying groundwater, but the appropriation of surplus groundwater is subordinate to the correlative rights of overlying users (BLM 2001).

As noted above, there have been no court actions involving water rights or water use in the CVGB. In accordance with a 2003 decision by the SWRCB identified as Water Rights Order (WRO) 2003-0004, which provided interpretation of California Water Code §1200, State jurisdictional waters include those which meet the following criteria: (1) A subsurface channel is present; (2) The channel has relatively impermeable bed and banks; (3) The course of the channel is known or may be determined by reasonable inference; and (4) Groundwater is flowing within the channel (SWRCB 2003). Waters that are identified as State jurisdictional waters are appropriated for use by state-issued permits. If it is determined that groundwater in the CVGB is State jurisdictional, such as if it is considered a subsurface channel as described in WRO 2003-0004, the CVGB would be managed by the SWRCB and use of groundwater from the CVGB would be determined through appropriation. Until determination of State jurisdiction is made, the CVGB will be governed by the equal and correlative doctrine described above.

The CVGB is expected to be used to meet the solar facility's construction water demand of 400.51 to 500.51 afy over a 24-month construction period, for a total construction water requirement of 801.02 to 1,001.02 acre-feet. Groundwater from the CVGB is also expected to be used to meet the solar facility's operational water requirement of 26.02 to 39.02 afy. The Applicant's Plan of Development (POD) indicates that pending the permitting and physical feasibility of using on-site groundwater wells, construction water will either be obtained from on-site wells and/or it would be pumped from off-site wells in the DHSP area and trucked to the project site. Potential impacts to groundwater supply and recharge are discussed in Section 4.20.

Water-bearing Features

Water-bearing formations in this groundwater basin include Pliocene to Quaternary age continental deposits divided into Quaternary alluvium, the Pinto Formation, and the Bouse Formation. These sediments are typical of basin fill deposits in the region, often containing

layers of fine materials (clays and silts) central to the basin and away from the mountain fronts. Conversely, sediments tend to coarsen (sands and gravels with cobbles) around the basin edges. The maximum thickness of these deposits is about 1,200 feet, thinning toward the edges and to the western end of the basin. These deposits are generally considered unconfined, but some portions of the aquifer may be semi-confined in central areas of the basin due to the abundance of clay materials. All of the sediments filling this basin are considered part of the same aquifer.

The average specific yield of the upper 500 feet of unconsolidated sediments is estimated (in 1979) to be 10 percent (DWR 2004a). "Specific yield" is the ratio of the volume of water that saturated rock or soil will yield by gravity drainage to the total volume of the rock or soil (DWR 2011a). Specific yield is an important factor in water availability and is the factor that is used to convert saturated thickness (water table elevation) to the actual volume of water available. Although the porosity of a formation will remain relatively constant, factors which vary with changes in saturated thickness include specific yield, average local porosity, and the volume of water in storage (Buddemeier and Schloss 2000).

Recharge and Connectivity

The CVGB is recharged by percolation of runoff from the surrounding mountains, percolation of precipitation to the valley floor, groundwater inflow from the Pinto Valley, and groundwater inflow from the eastern portion of the Orocopia Valley (DWR 2004a; BLM 2011a). The California DWR's Bulletin 118 states that the CVGB also receives subsurface flows from the Cadiz Valley Groundwater Basin. However, hydrogeology experts disagree with this connection; due to a general lack of data to characterize this connection, the current consensus is that there is no hydrologic connection between the CVGB and the Cadiz Valley Groundwater Basin.

As described under "Surface Water Resources," surface runoff from the surrounding mountains is largely ephemeral, with most surface water features containing flow only in direct response to precipitation events. As described in the introduction to this section, average annual precipitation in the DHSP area is 3.6 to 3.7 inches (BLM 2011a). Geologically or hydrologically connected groundwater basins are summarized below. The connection of each of these groundwater basins to the CVGB is described below and considered throughout the impact analysis presented in Section 4.20 of the EIS for the proposed project.

- **Pinto Valley Groundwater Basin.** Recharge to the Pinto Valley Groundwater Basin occurs through percolation of runoff from the surrounding mountains and precipitation to the valley floor and by underflow (DWR 2004b). The water that infiltrates the ground and reaches the water table percolates through the pore spaces in the water-bearing formations from points of replenishment toward points of discharge (USGS 2007). Under natural conditions, the only discharge from the Pinto Valley Groundwater Basin is underflow to the CVGB through unconsolidated deposits between exposures of consolidated rock of the Eagle and Coxcomb Mountains (USGS 2007). The water table in the Pinto Valley Groundwater Basin is deep enough that groundwater discharge from the transpiration of plants does not occur (USGS 2007). This basin is identified as Basin 7-6 by the California DWR.
- **Orocopia Valley Groundwater Basin.** This basin underlies the Orocopia Valley in central Riverside County, northeast of the Salton Sea. The western portion of the valley drains south and westward toward the Salton Sea, while the eastern portion of the basin drains eastward toward Hayfield Dry Lake and the CVGB. East-trending faults are located along the northern

and southern boundaries of the Orocopia Valley Groundwater Basin; the North Chiriaco fault is inferred to extend eastward into Chuckwalla Valley and is known to be a partial barrier to groundwater movement in the Orocopia Valley Groundwater Basin. Natural recharge in this basin occurs from subsurface inflow and infiltration of runoff from the surrounding mountains and rainfall to the valley floor (DWR 2004d). This basin is identified as Basin 7-31 by the California DWR.

The Metropolitan Water District of Southern California (MWD) has initiated a demonstration aquifer storage project in the Hayfield Dry Lake area, which is underlain by the Orocopia Valley Groundwater Basin. Nearly 60,000 acre-feet of Colorado River water have been placed in storage at this location. Work has been ongoing to develop production wells for water retrieval and to monitor aquifer conditions. This project is not fully active at this time. MWD has also studied a companion aquifer storage project in the northern and northeastern portions of the CVGB that are adjacent to the Colorado River Aqueduct. This project has not yet been implemented.

- **Cadiz Valley Groundwater Basin.** Sediments of the Cadiz Valley and the CVGB are in contact at the northern edge of the CVGB between the Coxcomb and the Granite Mountains. Although the DWR has reported that Cadiz Valley Groundwater Basin contributes subsurface flow to CVGB, more recent work has reportedly confirmed that the Cadiz Valley Groundwater Basin does not contribute inflow to the CVGB (CEC 2009). Based on expert opinion and the most recent available data, for the purposes of this analysis it is assumed that the Cadiz Valley Groundwater Basin is not hydrologically connected to the CVGB.
- **Palo Verde Mesa Groundwater Basin.** The Palo Verde Mesa Groundwater Basin is in eastern Riverside County to the east of the McCoy and Mule Mountains. This basin is made up of alluvial deposits and Colorado River terraces. Natural recharge to this basin occurs from percolation of runoff from the surrounding mountains, percolation of precipitation to the valley floor, groundwater inflow from the CVGB, and groundwater inflow from the Colorado River through its floodplain sediments (Palo Verde Valley Groundwater Basin). Groundwater movement is south and southeasterly into the Palo Verde Valley Groundwater Basin and the Colorado River. (DWR 2004e)

Groundwater Level Trends

Groundwater levels in the Hayfield Planning Area range from the ground surface to 400 feet below ground surface (bgs) (Colorado River Basin RWQCB 2006b). Specific to the CVGB, data show stable groundwater levels in the basin in 1963, and groundwater contours in 1979 indicate that groundwater moves from the north and west toward the gap between the Mule and McCoy Mountains at the southeastern end of the valley (DWR 2004a). The direction of groundwater movement is not anticipated to have changed since the aforementioned 1979 data; however, groundwater level trends may have changed substantially since 1963, due to development of the area and expanded groundwater uses. For example, data from wells within the Desert Center area show a period of water level decline from the mid-1980s through the early 1990s during periods of expanded agricultural operations when combined pumping exceeded 20,000 afy, well above historic water usage for the western portion of the basin (AECOM 2011). Since the mid-1990s, agricultural use of groundwater has declined and groundwater levels have partially recovered, at least in the western portion of the CVGB (AECOM 2011).

Groundwater level trends in the CVGB have been discussed in recent environmental analyses for other projects that could affect the basin. In comments provided on the Draft EIS for the Eagle Crest Pumped Storage Hydroelectric Project (Eagle Crest), the National Park Service (NPS), Joshua Tree National Park, has expressed concerns regarding the estimated budget for the CVGB, and the methodologies used in characterizing that budget (NPS 2010). The proposed DHSP is in the same groundwater basin as Eagle Crest, and the estimated groundwater budget used for the Eagle Crest analysis is used in part for the purposes of this analysis; therefore, the NPS' concerns regarding the estimated budget for the CVGB are addressed in this analysis.

The NPS notes that in general, groundwater levels in the CVGB appear to have been trending downwards for several decades. Most wells in the CVGB have not been used for monitoring data such as groundwater level trends since the 1980s; however, several wells have been used to collect groundwater data for the past 25 years, and these data show that groundwater level trends have either been fairly stable (for the eastern CVGB), dropping slowly but steadily (central CVGB), or rising slowly back towards pre-pumping groundwater levels (for the western CVGB). As shown on Figure 3.20-3, the proposed DHSP site is located in the western portion of the CVGB, where groundwater monitoring data suggests that groundwater levels have been starting to recover from overpumping in the 1980s. It is noteworthy that most of the long-term monitoring wells in the CVGB are situated within agricultural or prison operations, complicating extrapolation of any drawdowns shown in those data to the CVGB as a whole due to the site-specificity of those wells' cones of depression (a "cone of depression" refers to drawdown which occurs in a well when it is pumped, causing a conical-shaped gradient in the surrounding aquifer that results from water flowing from areas of high to low pressure; when two or more cones of depression intersect each other, the effect on drawdown (increasing depth to groundwater) is combined and water table levels drop substantially). (NPS 2010)

Due to the site-specific effects that cones of depression have on groundwater monitoring efforts, and the lack of data from non-pumping wells in the CVGB, existing groundwater data is not sufficient to characterize groundwater level trends throughout the CVGB. For these same reasons, existing data is not sufficient to determine with certainty that groundwater level trends in the CVGB, or in a portion of the CVGB, have recovered substantially since the cessation of large-scale agricultural pumping in the late 1980s. Therefore, although recent data indicates that groundwater level trends may be starting to recover in the vicinity of the proposed DHSP site, as noted by the NPS and discussed above, it is conservatively assumed that groundwater trend analyses are inconclusive.

Storage Characteristics

The California DWR reports that in 1975, the total storage capacity of the CVGB was understood to be 9,100,000 acre-feet, and that in 1979 the recoverable storage of this basin was understood to be 15,000,000 acre-feet (DWR 2004a). It is important to note that "storage capacity" does not reflect the actual amount of groundwater in storage, or the available groundwater supply, but rather is a function of the porosity of subsurface materials and the quantity of water that could theoretically be contained in the subsurface, based on this porosity. According to the DWR, the upper 100 feet of saturated sediments in the CVGB may have 900,000 acre-feet of groundwater in storage (DWR 2004a).

Safe Yield and Water Budget

The definitions of several terms which are critical to the analysis of groundwater conditions are listed below, as these terms are used throughout the following section.

- **Safe Yield** refers to the quantity of groundwater that can be withdrawn from a source or supply over a period of years without resulting in adverse effects such as depleting that source beyond its ability to be replenished annually, or impairing the native groundwater quality (SWRCB 2012). The safe yield may also be referred to as the "perennial yield."
- **Water Budget** refers to the annual difference in quantity between all inflows to a groundwater basin and all outflows from that basin, accounting for both natural and human-related sources and uses.
- **Overdraft** refers to the condition where a groundwater basin is drawn down beyond its ability to be replenished annually, or where the total production or outflow of water from all sources within a particular basin is less than the total recharge of water from all sources into that basin. Overdraft may occur on the short-term, where a groundwater basin recovers over a period of months or years, or it may be long-term and persistent, where a groundwater basin is consistently over-used and not provided the opportunity to recover. Overdraft conditions are not sustainable and can cause permanent harm to a groundwater resource; overdraft it is considered an adverse effect and is closely considered in this analysis.

There is currently a lack of long-term consistent groundwater monitoring data from throughout the CVGB, such as would be required to calculate safe yield, water budget, and overdraft (if present in the basin). Therefore, it is necessary to make reasonable assumptions in characterizing these aspects of the CVGB. A series of environmental analyses associated with other projects proposed for construction in this area have included estimates of safe yield and budget in the CVGB; the Draft EIS for the proposed DHSP included assumptions based on data and conclusions drawn from several of these analyses. In recent years, federal agencies including the NPS, the USGS, and the BLM have generated their own studies and analyses of the CVGB, some of this draw conclusions contrary to those used in the Draft EIS for the proposed DHSP. Therefore, this section has been revised to include discussion of all known professional opinions and conclusions regarding the current condition of the CVGB.

The DWR reports that in 1952, extractions from the CVGB totaled 11 acre-feet, increasing to 9,100 acre-feet in 1966, representing an increase of 82,627 percent over 14 years (DWR 2004a). As described under "Groundwater Level Trends," the DWR also reports stable groundwater levels in wells within the basin in 1963, suggesting that water use was being sustained by basin capacity at that time. The DWR reports no more recent estimates of safe yield for the CVGB. However, analyses of groundwater conditions in the CVGB have been prepared for other projects proposed in this area. In 1992, a safe yield amount of 12,200 afy was adopted in the EIS for the Eagle Crest Landfill Project. The BLM considered the Eagle Crest EIS estimate of safe yield to be low because the calculation appears to have used an amount of recharge from precipitation that was based on recharge to only a portion of the basin (BLM 2011a). In 2011, a revised water budget was adopted in the EIS for the Palen Solar Power Project, based on a wider array of available data than the 1992 Eagle Crest EIS, including but not limited to: published literature, water budget information from the DWR, data compiled by the California State Prison Authority, and other available information, as discussed below (BLM 2011a). The groundwater budget pre-

pared for the Palen Solar Power Project is summarized in Table 3.20-2 and discussed in the text following this table, with respect to the proposed Desert Harvest Solar Project.

Table 3.20-2. Estimated Budget for the CVGB, Based on Other Studies in the DHSP Area

Budget Components	Acre-Feet per Year
Inflow	
Recharge from Precipitation	9,448
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins[1]	3,500
Irrigation Return Flow	800
Wastewater Return Flow	636
Total Inflow	14,384
Outflow	
Groundwater Extraction	–10,361
Underflow to Palo Verde Mesa Groundwater Basin	–400
Evapotranspiration at Palen Dry Lake	–350
Construction of the Desert Sunlight Solar Farm Project	–650[2]
Total Outflow	–12,361
Budget Balance (Inflow – Outflow)	2,623

Source: BLM 2011a; BLM 2011b; CEC 2009.

1 - As described under "Recharge and Connectivity," the DWR identifies that the CVGB receives underflow from the Pinto Valley and Cadiz Valley Groundwater Basins (DWR 2004a), while the BLM identifies that the CVGB receives underflow from the Pinto Valley and Orocopia Valley Groundwater Basins (BLM 2011a). The DWR has not prepared a hydrologic budget for the CVGB or identified the quantity of underflow contributed to the CVGB from the Pinto and Cadiz Valley Groundwater Basins, whereas the BLM has prepared a hydrologic budget for the CVGB and identified the quantity of underflow contributed to the CVGB from the Pinto and Orocopia Valley Groundwater Basins. Therefore, due to the availability of quantitative data, this groundwater budget characterizes underflow from the Pinto and Orocopia Valley Groundwater Basins, but not the Cadiz Valley Groundwater Basin.

2 - Environmental baseline conditions are defined as the existing physical conditions at the time of publication of the Notice of Intent for the Desert Harvest Solar Project (September 15, 2011). The solar field associated with the Desert Sunlight Solar Farm project was under construction at the time of preparation of the Notice of Intent. Table 2.2-2 of the Final EIS prepared for the Desert Sunlight Solar Farm project (BLM 2011b) indicates that construction of the solar field requires a total water supply of 1,200 to 1,300 acre-feet, over a 26-month construction period, or roughly 600 to 650 afy. In order to be conservative, an outflow of 650 afy associated with the Desert Sunlight solar field has been incorporated into the current groundwater budget for the CVGB to characterize baseline conditions.

Recharge associated with the potential Chuckwalla Groundwater Storage Program, described above in the discussion of "Recharge and Connectivity," is not accounted for in the groundwater budget summarized in Table 3.20-2 because at the time of preparation of the Draft EIS, this program has not been implemented. Table 3.20-2 indicates that the current total inflow to the CVGB is 14,384 afy and the current total outflow is 12,361 afy, resulting in a groundwater budget balance, or total outflow subtracted from total inflow, of 2,623 afy. This positive hydrologic budget balance indicates that, according to the assumptions used in constructing the balance shown in Table 3,20-2, the CVGB is not currently affected by long-term overdraft conditions.

It is important to note that the estimates provided in Table 3.20-2 are based on information and assumptions contained in studies conducted for other projects in the vicinity of the proposed DHSP. Independent analyses of the CVGB conducted in recent years have drawn conclusions which are contrary to the budget presented in Table 3.20-2, particularly with regards to the rate of groundwater recharge. Therefore, the groundwater budget presented below in Table 3.20-3 is based on conclusions drawn by the NPS and USGS in their independent analysis of the CVGB and surrounding basins.

Table 3.20-3. Estimated Budget for the CVGB, based on NPS and USGS Conclusions

Budget Components	Acre-Feet per Year
Inflow	
Recharge from Precipitation	2,060 – 6,125
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins	953 – 1,906
Irrigation Return Flow	800
Wastewater Return Flow	636
Total Inflow	4,449 – 9,467
Outflow	
Groundwater Extraction	–10,361
Underflow to Palo Verde Mesa Groundwater Basin	–400
Evapotranspiration at Palen Dry Lake	–350
Construction of the Desert Sunlight Solar Farm Project	–650[2]
Total Outflow	–12,361
Budget Balance (Inflow – Outflow)	**–2,894 – –7,912**

Source: NPS 2010; BLM 2012

Table 3.20-3 indicates that the current total inflow to the CVGB ranges between 4,449 and 9,467 afy, while the current total outflow rate for the CVGB is 12,361 afy. The resulting balance shown in Table 3.20-3 is negative, indicating groundwater overdraft conditions ranging between 2,894 and 7,912 afy.

A comparison of Tables 2.30-2 and 2.30-3 show that the main differences in these water budget calculations occurs in the estimates of recharge from precipitation and recharge from underflow. Due to variability in expert opinion and associated estimations and conclusions, it is important to assess each component of the budget presented in Tables 3.20-2 and 3.20-3 in detail. Therefore, each component of the water budgets presented above is discussed in the following sections, and assumptions used to define the water budget components associated with both budgets provided above (Tables 3.20-2 and 3.20-3) are thoroughly defined in the following discussions.

Precipitation and Underflow

The California DWR has not published an estimated rate of recharge from precipitation to the CVGB, and estimates of recharge from precipitation that have been prepared in support of other projects in the area have had variable results. Similarly, there is also variability in estimates of recharge to the CVGB associated with underflow from the Pinto and Orocopia Valley Groundwater Basins, also as identified in environmental analyses for other projects in the area. Table 3.20-4, below, shows the discrepancies in recharge quantities identified in the environmental analyses prepared for various other projects in the DHSP area, specifically as related to recharge from precipitation and from hydrologically connected groundwater basins (noting that the CVGB also receives recharge from irrigation and wastewater return flow, which are described below).

Table 3.20-4. Comparison of Natural Recharge Estimates from Various Studies

Study	Recharge from Precipitation (afy)	Underflow from Pinto and Orocopia Basins (afy)	Total Recharge from Precipitation and Underflow
Genesis Solar Project EIS[1]	9,448	3,500	12,948
Eagle Mountain Draft EIR[2]	5,500	6,700	12,200
Palen Solar Project EIS[3]	8,588	3,500	12,088
Eagle Mountain Draft EIS[4]	6,125	6,575	12,700
Low – High (Average)	5,500 – 9,448 (7,042)	3,500 – 6,700 (5,395)	12,088 – 12,948 (12,437)

1 - Source: CEC 2009.
2 - Source: SWRCB 2010.
3 - Source: BLM 2011b.
4 - Source: FERC 2010.

As shown in Table 3.20-4, estimates of recharge from precipitation and underflow that have been presented in other environmental analyses in the area range between 12,088 and 12,948 afy; this is a total difference of 860 afy, although the difference in precipitation estimates is 3,948 afy and the difference in underflow estimates is 3,200 afy.

Recharge from precipitation is estimated as a percentage of total precipitation in the Chuckwalla Valley. For instance, both the Palen and Genesis analyses assessed the quantity of recharge from precipitation by overlaying isohyetal maps over the Chuckwalla watershed boundaries and calculating the volume of average annual precipitation across the valley and bedrock portions of the watershed. Both analyses describe the Chuckwalla Valley watershed as being comprised of the Palen sub-watershed and the Ford sub-watershed, which receive total precipitation in the amounts of 156,000 afy and 159,000 afy, respectively; therefore, the Chuckwalla Valley watershed receives a total precipitation amount of 315,000 afy. (CEC 2009; BLM 2011b)

The Palen analysis estimated recharge from precipitation as 3, 5, and 7 percent of total incident precipitation in the watershed, noting that this equates to 8,588, 14,313, and 20,038 afy, respectively (BLM 2011b). The Genesis analysis estimated recharge from precipitation as a fraction of 2, 3, 5 and 10 percent of total incident precipitation in the watershed, noting that this equates to 6,300, 9,448, 15,750 and 31,500 afy, respectively (CEC 2009). Both analyses note that studies published by the USGS report 7 to 8 percent of precipitation falling on bedrock mountains in other arid basins goes to mountain front recharge, which would equate to 3 percent of the total precipitation that falls in the Chuckwalla Valley watershed; therefore, both analyses determine that 3 percent of total precipitation falling on the Chuckwalla Valley watershed is the lower estimate of recharge to the CVGB from precipitation. As noted above, total precipitation in the Chuckwalla Valley watershed equates to 315,000 afy; 3 percent of this estimate is approximately 9,450 afy. (CEC 2009; BLM 2011b)

Table 3.20-4 also notes rates of precipitation and underflow recharge that were identified in the EIR and EIS for the Eagle Mountain Pumped Storage Project. The EIS and EIR for the Eagle Mountain Pumped Storage Project, upon which the NPS' original comments regarding natural recharge were made, were produced by the Federal Energy Regulatory Commission (FERC) and the California State Water Resources Control Board (SWRCB), respectively (FERC 2010; SWRCB 2010). In the EIS and EIR analyses, the FERC and SWRCB relied upon analysis of the CVGB conducted by GEI Consultants and presented in a Technical Memorandum included as an appendix to both the EIS and EIR (FERC 2010; SWRCB 2010). The GEI Technical Memorandum discusses two methods of calculating recharge to the CVGB:

- The Maxey-Eakin method of modeling natural groundwater recharge rates and patterns was applied to the CVGB, and produced a range of between 600 and 3,100 afy; and
- The MWD Review Panel method cited in a study of the Fenner Basin, north of the CVGB, indicates a recharge range of 7,600 to 17,700 afy for the CVGB (NPS 2010).

GEI Consultants selected the MWD Review Panel method for assessing recharge rates to the CVGB. As noted throughout this section, professional opinions often conflict regarding the characterization of groundwater resources. In this case, GEI Consultants determined that the MWD Review Panel was an appropriate method to use in characterizing the CVGB, while the NPS contended in comments on the Eagle Mountain EIS and EIR that the MWD Review Panel is unrealistic (NPS 2010); NPS concerns are discussed further below.

As shown in Table 3.20-4, the Eagle Mountain EIS (FERC) and EIR (SWRCB) identified recharge from precipitation as 6,125 afy and 5,500 afy, respectively, and recharge from underflow as 6,575 afy and 6,700 afy, respectively. As noted in Table 3.20-2, the Draft EIS for the proposed DHSP identified recharge from precipitation as 9,448 afy (based on data from the Genesis Solar Project EIS), and recharge from underflow as 3,500 afy (based on data from the Genesis EIS and the Palen EIS). As shown in Table 3.20-4, 9,448 afy is the highest value for recharge from precipitation identified among the four listed analyses, while 3,500 afy is the lowest value for recharge from underflow.

According to the Genesis EIS and the Palen EIS, inflow to the CVGB from the Pinto Valley Groundwater Basin was estimated to be 3,173 afy, while inflow from the Orocopia Valley Groundwater Basin was estimated to be 1,700 afy (BLM 2011b; CEC 2009). Other studies indicate that subsurface flow to the CVGB from Orocopia Valley Groundwater Basin could be as low as several hundred afy (BLM 2011a). In order to account for this uncertainty, a combined subsurface inflow rate of 3,500 afy was assumed for both basins in the Draft EIS for the proposed DHSP. As shown in Table 3.20-4 and noted above, 3,500 afy is the lowest value for recharge from underflow identified among the four listed analyses. In addition, although the DWR has reported that Cadiz Valley Groundwater Basin contributes subsurface flow to CVGB, more recent work indicates that the Cadiz Valley Groundwater Basin does not contribute inflow to the CVGB (CEC 2009). Therefore, for the purposes of this EIS, safe yield for the CVGB is assumed to include subsurface flow from the Pinto Valley and Orocopia Valley Groundwater Basins but not the Cadiz Basin. In total, the Draft EIS for the proposed DHSP assumed recharge from precipitation and underflow to be 12,948 afy, as listed in Table 3.20-2.

As previously noted, there is substantial variation in expert opinion regarding the realistic rate of recharge to the CVGB from precipitation and underflow. In 2010, the NPS provided extensive comments on the EIS for the Eagle Mountain Pumped Storage Project, listed in Table 3.20-4 as identifying recharge from precipitation at 6,125 afy and recharge from underflow at 6,575 afy, for a total quantity of natural recharge at 12,700 afy, a quantity that is similar to that used in the Draft EIS for the proposed DHSP (12,948 afy). In their comments, the NPS identified substantially lower estimates of recharge from precipitation, and contended that the budget for the CVGB is actually negative, indicating that the basin is in a state of overdraft.

The NPS' conclusions regarding the CVGB water budget are based on research conducted by the U.S. Geological Survey (USGS) on groundwater basins around the town of Joshua Tree. Specifically, the principal areas of interest for the USGS study were the Warren, Joshua Tree, and

Copper Mountain Groundwater Basins (USGS 2004). None of these groundwater basins is adjacent to the CVGB (see Figure 3.20-3), and neither the USGS nor the NPS conducted groundwater monitoring in the CVGB, the Orocopia Valley Basin, or the Pinto Valley Basin in support of this study. Rather, the NPS draws conclusions about recharge in the CVGB, Pinto Valley Groundwater Basin, and Orocopia Valley Groundwater Basin using the USGS methodologies and conclusions in assessing the Warren, Joshua Tree, and Copper Mountain Groundwater Basins, and extrapolating data for applicability to the proposed DHSP area (NPS 2010). Groundwater basins in the proposed DHSP area are identified in Figure 3.20-3 (In comparison with Figure 3.20-3, which shows the CVGB and adjacent groundwater basins, Figure 3.20-1 shows surface water planning areas in the project region, including the Chuckwalla HU and the adjacent Joshua Tree HU – note that these HUs are surface water planning areas and are not the same as the CVGB and the Joshua Tree Groundwater Basin which, as noted above, are not hydrologically connected).

The USGS study involved collection of groundwater monitoring data from wells in the Warren, Joshua Tree, and Copper Mountain Groundwater Basins, and analysis of this data using a groundwater modeling program called INFILv3 (USGS 2004). As described in the USGS study (page 61), the INFILv3 watershed model results can have high uncertainty associated with the simplification of assumptions and uncertainty in model inputs, but was selected because it accounts for factors including climate, surface flows, and hydrologic processes in the upper unsaturated zone (the root zone), as well as physical characteristics of the drainage basin such as topography, surficial geology, soils, and vegetation; the INFILv3 model was considered by the USGS to have greater advantages than other methods of estimating recharge, such as empirical methods or geochemistry, because it accounts for a wide variety of natural factors (USGS 2004).

The results of the USGS study suggest that present-day groundwater recharge to basins "in the region of the Mojave Desert" is very limited, and that the majority of recharge to basins in this region may be coming from existing groundwater storage, not from natural replenishment (NPS 2010). Key results from the USGS study include the following:

- Sources of natural recharge to the Warren, Joshua Tree, and Copper Mountain Groundwater Basins are limited to infiltration of channelized stormflow runoff, groundwater underflow from neighboring basins, and septage infiltration;
- Infiltration of precipitation to depths below the root zone and subsequent groundwater recharge did not occur in the Joshua Tree area (to the west-northwest of the CVGB);
- Winter precipitation is the predominant source of groundwater recharge, based on Oxygen-18 and deuterium data collected in the Warren, Joshua Tree, and Copper Mountain Basins;
- Minimal recharge has reached the water table (associated with the Warren, Joshua Tree, and Copper Mountain Basins) since 1952, based on Carbon-14 data;
- Most recharge to the Warren, Joshua Tree, and Copper Mountain Basins likely occurs during unusually wet periods or isolated occurrences of extreme storms that are separated by relatively long (multi-year to multi-decade) periods of negligible recharge; and
- The vast majority of groundwater pumped from the Warren, Joshua Tree, and Copper Mountain Basins between 1958 and 2001 was removed from groundwater storage (as opposed to drawing on recharge), resulting in a 35-foot decline in measured groundwater levels in these basins (NPS 2010; USGS 2004).

As noted, the NPS extrapolated data and conclusions of the USGS study for applicability to the CVGB and contributing basins (Pinto Valley and Orocopia Valley Groundwater Basins), contending that the MWD Review Panel method used by GEI Consultants in support of the Eagle Mountain EIS and EIR grossly under-estimated recharge quantities, and the Maxey-Eakin methodology rejected by the GEI assessment provided a more realistic estimate of recharge. As previously noted, the Maxey-Eakin method identified recharge rates to the CVGB as a range of 600 to 3,100 afy, while the MWD Review Panel method identified a range of 7,600 to 17,700 afy. The NPS used results of the USGS study to derive a range of recharge coefficients, which were then applied to the project study area basins (CVGB, Pinto Valley Groundwater Basin, Orocopia Valley Groundwater Basin), to identify a estimated range of total recharge of 3,300 to 6,000 afy; the NPS notes that this estimate is consistent with the upper range of the Maxey-Eakin approach, suggesting that the Maxey-Eakin method is more realistic than the MWD Review Panel method used in the Eagle Mountain analysis (NPS 2010).

The NPS's recharge coefficients were derived by taking the total annual recharge estimates for the whole Joshua Tree study area (1,090 acre-feet) and the basins located west of the Pinto Valley (sub-basin CM18, 244 acre-feet), and dividing them by their respective basin areas (159,801 acres and 64,994 acres), to produce recharge coefficients of 0.0068 acre-feet/acre and 0.0038 acre-feet/acre, respectively. The NPS applied these extrapolated recharge coefficients to the CVGB, the Pinto Valley Groundwater Basin, and the Orocopia Valley Groundwater Basin to identify estimated ranges of recharge to each of those basins, and to estimate rates of flow from the Pinto and Orocopia Valley Basins into the CVGB. The NPS' recharge estimates for the CVGB are provided below, in Table 3.20-5.

Table 3.20-5. Natural Recharge Estimates Proposed by the NPS, Extrapolated from USGS Data

Source of Recharge to the CVGB	Estimated Quantity (afy)
Precipitation (Within the CVGB)	2,060 – 6,125
Pinto Valley Groundwater Basin	624 – 1,248
Orocopia Valley Groundwater Basin	329 – 658
Total Recharge from Precipitation and Underflow	3,013 – 8,031

Source: NPS 2010; BLM 2012; Godfrey et al. 2012

As described in the table above, the NPS' approach of extrapolating USGS data to estimate the rate of groundwater recharge to the CVGB indicates that the CVGB receives between 3,013 and 8,031 afy of recharge from in-basin precipitation and from underflow associated with the Pinto Valley and Orocopia Valley Groundwater Basins. The NPS further notes that the total annual streamflow recharge rates simulated by the USGS may be two to ten times greater than the measured total annual stream flow, suggesting that the recharge values estimated by the INFILv3 model described in the 2004 USGS study may also be high by a factor of two to ten (NPS 2010). If it is true that the USGS model is skewed by a factor of two to ten, total annual recharge to the CVGB and the Pinto Valley and Orocopia Valley Groundwater Basins could be as low as 300 to 3,000 afy; this range is nearly identical to the range predicted by the Maxey-Eakin method, which is the method preferred by the NPS (NPS 2010). However, assuming that the USGS simulated streamflow recharge rates are reasonable, the NPS also adopts the groundwater recharge rates shown in Table 3.20-5 as reasonable.

The range for groundwater recharge shown in Table 3.20-5 is substantially lower than the values shown in Table 3.20-4 (Comparison of Natural Recharge Estimates from Various Studies), which is why the water budget shown in Table 3.20-2, which was used in the Draft EIS analysis for the proposed DHSP, is so different from the water budget shown in Table 3.20-3, which has been incorporated to this analysis for the purposes of the Final EIS for the proposed DHSP. Table 3.20-6, below, provides a side-by-side comparison of the recharge ranges identified by other studies in the DHSP area and by the NPS (based on the USGS 2004 analysis).

Table 3.20-6. Comparison of Natural Recharge Estimates

Source of Estimate	Identified Range (afy)	Average (afy)
Other Studies in the DHSP Area	12,088 – 12,948	12,437
NPS Study (based on USGS)	3,013 – 8,031	5,522
Difference Between Expert Opinions	9,075 – 4,917	6,915

Table 3.20-6 indicates vast differences in estimated rates of recharge to the CVGB from natural sources (precipitation and underflow). These differences are the result of several factors, including but not limited to the following: widely varying expert opinion on the subject of groundwater recharge, uncertainties inherent in the use of computer models to simulate groundwater behavior and characteristics, and a general lack of long-term groundwater monitoring data. In order to address the discrepancy shown in Table 3.20-6 and appropriately characterize potential conditions in the CVGB, while presenting a full range of possible outcomes and consequences associated with the proposed DHSP, this Final EIS incorporates discussion of all expert opinions regarding the rate of natural recharge to the CVGB, and the effect that this value has on the overall water budget.

In further analysis of recharge to the CVGB, the NPS constructed comparative water balances for the CVGB over 60 years of historical pumping in the basin, using the recharge estimate identified by GEI Consultants for the Eagle Mountain analyses of 12,700 afy, in comparison to mean extrapolated lower recharge estimate of 3,013 afy identified by the NPS in aforementioned comments on the Eagle Mountain analyses. The NPS constructed these historic water balances using information presented in the Eagle Mountain EIS (FERC) and EIR (SWRCB). Through this comparative analysis, the NPS concluded that if the estimates of water stored in the CVGB identified in the Eagle Mountain analyses were true, the volume of water in storage in the CVGB should have increased between 1948 and 2007 by approximately 267,000 acre-feet, equating to a rate of 4,450 afy (NPS 2010). According to the NPS, such an increase would only be possible if one of the following occurred: average water level rise of approximately 18 feet across the basin; increased discharge by ET, and/or increased subsurface outflow from the CVGB. The NPS determined that none of these three indicators is evident in the CVGB, based on the best available information. (NPS 2010; Godfrey et al. 2012)

Conversely, using the NPS estimates for recharge to the CVGB, the volume of water in storage should have decreased between 1948 and 2007 by approximately 314,000 acre-feet, which roughly equates to an average water level decline of 21 feet across the basin. The NPS further justifies their adopted lower recharge estimates by citing what appear to be generally declining water levels across most of the CVGB over the last 60 years, coinciding with the conclusions of their historic analysis. The NPS concludes that their historical water balance analysis suggests

that (1) recharge of 12,700 afy for the CVGB is likely too high, and (2) the CVGB overall may have been in an ongoing state of overdraft for several decades. (Godfrey et al. 2012)

As described throughout this section, there is a general lack of agreement among experts regarding the rate of groundwater recharge to the CVGB and connected groundwater basins. In the absence of comprehensive, long-term groundwater monitoring data collected throughout the CVGB, it is expected that there will continue to be academic disagreement on what the annual recharge rates and perennial yields are in the CVGB. Considering analysis produced by the NPS and based on USGS research, it is possible that annual recharge to the CVGB may be much lower than the recharge estimates identified in the Draft EIS for the proposed DHSP, and used in characterizing potential impacts associated with implementation of the DHSP. Therefore, the analysis of groundwater recharge and potential effects of the proposed DHSP on groundwater has been expanded to address all known professional opinions regarding groundwater recharge.

Irrigation Return Flow

The amount of applied irrigation water that returns to recharge a groundwater basin depends on the soil, crop type, amount and method of irrigation, and climatic factors. In water budget calculations for the Chuckwalla Planning Area in support of California Water Plan updates, an irrigation return flow of 9 to 11 percent was calculated for 1998, 2000, and 2001, respectively. A 10 percent return flow is therefore considered reasonable for deep percolation from irrigation. Current pumpage associated with irrigation return flow is estimated to be 7,700 afy in the CVGB, accounting for 6,400 afy from agriculture, 215 afy from aquaculture pumping, and 1,090 afy from Tamarisk Lake. Therefore, return flows calculated using the 10 percent factor are approximately 800 afy. (BLM 2011a)

Wastewater Return Flow

Wastewater return flows from the Chuckwalla and Ironwood State Prisons contribute to the CVGB budget, as well as residential use particularly in the Lake Tamarisk development near Desert Center (BLM 2011a). Chuckwalla State Prison was constructed in 1988, and Ironwood State Prison became operational in 1994. These prisons use an unlined pond to dispose of treated wastewater, a large percentage of which is reported to infiltrate into the subsurface and recharge the CVGB (BLM 2011a). For the years 1998 through 2001, the California DWR Division of Planning and Local Assistance (CDWR-DPLA) reported that deep percolation of applied urban water in the Chuckwalla Planning Area (assumed to be wastewater return flow) was 500 to 800 afy. According to authorities at the State prison complex, approximately 600 afy of treated effluent recharges the CVGB. Water budget information for the proposed Eagle Crest Pumped Storage Project indicates 795 afy of treated effluent are recharged by the prisons, but that populations at the prisons are projected to reduce by about 35 percent in order to alleviate over-crowding, and that associated recharge to the CVGB would also reduce to 600 afy (ECE 2008; FERC 2010). For the purposes of this analysis, it is conservatively assumed that wastewater return flow from the prisons is 600 afy, accounting for a reduction in prisoner population that could occur during implementation of the DHSP. An additional source of wastewater return flow in the basin is 36 afy from the Lake Tamarisk development near Desert Center (BLM 2011a). With consideration to the Chuckwalla and Ironwood State Prisons, as well as the Lake Tamarisk development, total wastewater return flow to the CVGB is estimated to be 636 afy.

Groundwater Extraction

Groundwater pumping in the CVGB includes agricultural water demand, pumping for Chuckwalla and Ironwood State prisons, pumping for the Tamarisk Lake development and golf course, domestic pumping, and a minor amount of pumping by Southern California Gas Company. Most of the current groundwater pumping in the CVGB occurs in the western portion of the basin, near the community of Desert Center. Current groundwater pumping rates are estimated to be 7,900 afy in the western CVGB and 2,605 afy in the eastern basin. Agricultural production is limited to the western portion of the basin, with the exception of a relatively limited amount of acreage that is associated with the State prisons. (BLM 2011a)

As described in a footnote to Table 3.20-2, baseline environmental conditions relevant to the CVGB estimated budget include groundwater extractions associated with construction of the solar field for the adjacent Desert Sunlight Solar Farm project, which is under construction of its first phase as of the initiation of analysis for this EIS. Water demands associated with renewable energy projects which have been approved but are not yet under construction (at the commencement of analysis for this EIS, or September 2011) are not identified under existing groundwater extractions because these projects have not yet initiated groundwater pumping and consumption. One exception to this is the Genesis Solar Energy Project, which was issued a Notice to Proceed on August 24, 2011, and therefore could have been under active construction by September 2011. Section 2.2.3 (page 2-11) of the Final EIS for the Genesis project indicates that the first month of construction would entail site preparation, which includes detailed construction surveys, mobilization of construction staff, grading, and preparation of drainage features (BLM 2010). It is reasonably assumed that if construction of the Genesis project initiated immediately upon issuance of the Notice to Proceed, construction activities requiring the project's full water requirement of 1,368 afy would not have initiated within a few days due to the need to complete site preparation activities (noted above) which would not require a water source. Water demands associated with the Genesis project as well as other reasonably foreseeable projects in the DHSP area are addressed in the cumulative impacts discussion presented in Section 4.20.13 of this EIS.

Underflow to Palo Verde Mesa Groundwater Basin

As described above in the discussion of "Recharge and Connectivity," the CVGB contributes subsurface flow to the Palo Verde Mesa Groundwater Basin. Subsurface outflow to the Palo Verde Mesa Groundwater Basin was estimated in 1973 to be 400 afy, based on a cross sectional profile of the boundary between the Palo Verde Mesa Groundwater Basin and the CVGB which was derived using geophysical methods and regional data regarding groundwater gradients and hydraulic conductivity. This estimate was revised in 1986 based on the results of pump testing at Chuckwalla State Prison, resulting in estimated outflow of 870 afy. In 1990, outflow was estimated to be 1,162 afy based on return flow from prison wastewater disposal; however, the rationale for this adjustment was not provided. In 1994, gravity data was used to determine that the area through which discharge occurs is significantly more limited than previously thought due to the presence of a buried bedrock ridge. Therefore, for the purposes of this current estimate of groundwater budget for the CVGB, the most recent available outflow rate is considered to be 400 afy. (BLM 2011a)

Evapotranspiration at Palen Dry Lake

Groundwater elevation contour mapping suggests that groundwater may occur near the surface beneath the northwestern 25 percent of Palen Lake. Therefore it is considered possible that a portion of Palen Lake is operating as a wet playa (described above under "Surface Water Resources). Groundwater levels beneath the southeastern portions of Palen Lake, and a small ancillary playa located 1 mile southeast of Palen Lake, were reported as being 20 to 30 feet bgs in 1979, suggesting that Palen Lake would be a dry playa at various times. (BLM 2011a)

Groundwater levels in a well located 2 miles north of Palen Lake were reported to be 20 to 25 feet bgs between 1932 and 1984. Surface elevation at Palen Lake 2 miles to the south of this well is 460 feet above mean sea level (amsl), or 40 feet lower; it therefore appears possible that groundwater levels are very close to the ground surface beneath the northern portion of the playa. It is possible that an area in the northern portion of Palen Lake is discharging groundwater by evaporation as a wet playa. (BLM 2011a)

Field work conducted in December of 2009 included the implementation of borings to 10 feet bgs in an identified salt pan area in the northwest portion of Palen Dry Lake. The moisture content of the soil was observed to increase with depth in both borings, and free groundwater was encountered at a depth of 8 feet bgs in one of the borings. A depth of 6 to 10 feet bgs is generally the maximum depth of free water documented beneath discharging playas, suggesting that local groundwater could be shallow enough to discharge at the surface by capillary rise and evaporation. (BLM 2011a)

Groundwater discharge rates were estimated based on reported groundwater discharge rates at other playas, the area of identified salt accumulation in Palen Lake, and an evident episodic or intermittent nature of salt accumulation. Measured evapotranspiration rates at Franklin Lake Playa were used to form a basis for this estimate, calculated to be 38 to 41 centimeters per year (cm/year) (1.3 to 1.4 feet per year) based on the Energy-Balance Eddy-Correlation method, which is reported to be the most reliable method by the USGS. These rates are considered a conservative measure of evapotranspiration for active wet playa areas at Palen Lake. (BLM 2011a)

The total area of potential groundwater discharge at Palen Lake is estimated to be 2,000 acres, with salt pan occupying 700 acres of this total. Due to differences between Palen Lake and Franklin Lake Playa, a groundwater discharge rate that is half that at Franklin Lake Playa was adopted for Palen Lake (0.0583 feet/acre/month of water), equating to approximately 350 afy over an area of 2,000 acres for three months of the year. (BLM 2011a)

Colorado River Accounting Surface

The USGS has indicated that the CVGB is within a basin tributary to the Colorado River, indicating that wells which draw groundwater from the CVGB could be withdrawing water from the Colorado River Aquifer (USGS 2008). All water in the Colorado River is apportioned for use, meaning it is designated for specific users and uses and may not be consumed beyond the conditions of designated rights. Due to the hydrologic connection between the CVGB and the Colorado River, all groundwater production at the DHSP site from wells that have a static water-level elevation near (within +/- 0.84 feet at the 95-percent confidence level), equal to, or below

the elevation of the Accounting Surface are presumed to yield water that will be replaced by water from the Colorado River.

The USGS has developed a concept for determining groundwater levels in wells which would be recharged by Colorado River water (USGS 2008):

> *The accounting surface represents the elevation and slope of the unconfined static water table in the river aquifer outside the flood plain and the reservoirs of the Colorado River that would exist if the river were the only source of water to the river aquifer… This method provides an organized way to identify those wells presumed to yield water that will be replaced by water from the river by determining if the elevation of the static water table at a well is above or below the accounting surface.*

The Colorado River Accounting Surface, as defined above, for waters in the CVGB is 234 feet amsl, which suggests that groundwater at or below an elevation of 234 feet amsl can be considered recharge from the adjudicated Colorado River (JR Associates 2009).

Groundwater monitoring data in the vicinity of the DHSP site indicates that groundwater elevation ranges between 385 and 504 feet amsl, and groundwater elevation measured at wells proximal to the Desert Sunlight Solar Project site, adjacent to the north of the proposed DHSP site, ranges between 483 and 488 feet amsl. A review of cross sections and potentiometric maps from prior investigations of the Upper Chuckwalla Valley show that the water level elevation has been interpreted to be between about 500 to 540 feet amsl in this area. These water level data, obtained from both groundwater well monitoring and interpretation of potentiometric surfaces, were collected between 1961 and 1992, and indicate that static groundwater level in the vicinity of the DHSP site is above the Colorado River Accounting Surface. Additionally, groundwater monitoring data obtained in the year 2000 at a well near the community of Desert Center (Well 5S/16E-17P92), approximately three miles south of the proposed DHSP site, indicate a water elevation of 462 feet amsl, or approximately 230 feet above the Colorado River Accounting Surface. (AECOM 2011)

Groundwater Quality

Groundwater quality varies throughout the CVGB. South and west of Palen Lake, groundwater is typically sodium chloride to sodium sulfate-chloride in character. Total Dissolved Solids (TDS) concentrations across the basin range from 274 to 12,300 mg/L. Sulfate, chloride, fluoride, and TDS concentrations are high for domestic use, while boron, TDS, and sodium concentrations are high for irrigation use. (DWR 2004a)

Beneficial uses for groundwater resources are identified by the planning area, and by the HUs encompassed by each planning area. Table 3.20-7, below, identifies the beneficial uses relevant to groundwater resources within the Hayfield Planning Area. As discussed in the introduction to this section, the DHSP is located within the Chuckwalla HU, which, as identified below and in the Basin Plan, is also located within the Hayfield Planning Area. Other HUs located within the Hayfield Planning Area include the Rice HU and the Hayfield HU. For consistency with the Basin Plan, Table 3.20-7 identifies beneficial uses for groundwater resources within all three HUs located within the Hayfield Planning Area, although the project would only occur within the Chuckwalla HU.

Table 3.20-7. Beneficial Uses of Groundwater Resources in the Project Area and Vicinity

	Beneficial Use Designation[1]		
Hayfield Planning Area	MUN[2]	IND	AGR
Rice Hydrologic Unit	X		
Chuckwalla Hydrologic Unit	X	X	X
Hayfield Hydrologic Unit			

1 - MUN: Municipal and Domestic Supply; IND: Industrial Service Supply; AGR: Agriculture Supply.
2 - At such time as the need arises to know whether a particular aquifer which has no known existing MUN use should be considered as a source of drinking water, the Regional Board will make such a determination based on the criteria listed in the "Sources of Drinking Water Policy" in Chapter 2 of this Basin Plan. An "X" placed under the MUN in this table for a particular hydrologic unit indicates only that at least one of the aquifers in that unit currently supports a MUN beneficial use. For example, the actual MUN usage of the Imperial hydrologic unit is limited only to a small portion of that ground water unit.
Source: Colorado River Basin RWQCB 2006b.

Potential impacts associated with beneficial uses and water quality are discussed in Section 4.20 of this EIS.

3.21 SOLID AND HAZARDOUS WASTES

This section describes the existing conditions related to solid and hazardous wastes that could be affected by implementation of the proposed Desert Harvest Solar Project (DHSP). The project study area includes all areas where the proposed project and alternatives could affect the following: wastes generated on-site, disposal of wastes generated on-site, septic system, landfill use and capacity, and emergency response and evacuation relevant to hazardous wastes.

3.21.1 Applicable Plans, Policies, and Regulations

Existing laws and regulations applicable to solid and hazardous wastes are described below. In some cases, compliance with these existing laws and regulations would serve to reduce or avoid certain impacts that might otherwise occur with the implementation of the proposed project or alternatives.

Federal

Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) of 1980 (42 USC. § 9601 et seq.)

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) provides a federal Superfund to clean up uncontrolled or abandoned hazardous waste sites as well as accidents, spills and other emergency releases of pollutants and contaminants into the environment. The United States Environmental Protection Agency (USEPA) generally administers CERCLA. This law provides broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Superfund Amendments and Reauthorization Act of 1986 (Title III 40 CFR§ 68.110 et seq.)

The Superfund Amendments and Reauthorization Act amended CERCLA and established a nationwide emergency planning and response program, and imposed reporting requirements for businesses that store, handle or produce significant quantities of extremely hazardous materials. Administered by the USEPA, the act requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. Additionally, the Superfund Amendments and Reauthorization Act identifies requirements for planning, reporting, and notification concerning hazardous materials.

Clean Water Act (33 USC. §1251 et seq.)

The Clean Water Act (CWA) is the principal federal statute protecting navigable waters of the United States and adjoining shorelines from the discharge of pollution from point sources. Since its enactment, the CWA has formed the foundation for the regulations and permitting of pollution prevention and response measures in waters subject to federal jurisdiction. The CWA establishes basic structure for regulating discharges of pollutants into the waters of the United States; establishes pollution control programs such as setting wastewater standards for industry; and sets water quality standards for all contaminants in surface waters. The CWA generally applies to surface Waters of the United States, and the Army Corps of Engineers (USACE) has not formally determined whether any jurisdictional waters occur on the site of the proposed project or alternatives. However, based on previous USACE determinations that waters are not jurisdictional on the adjacent Desert Sunlight Solar Farm project, it is not expected that USACE will

take jurisdiction for the proposed project and alternatives. Nevertheless, CWA requirements are set forth below. Please see Section 3.20.1 for further discussion of the CWA.

Oil Pollution Prevention (40 CFR Part 112)

The goal of the oil pollution prevention regulation in 40 Code of Federal Regulations (CFR) Part 112 is to prevent oil discharges from reaching navigable waters of the United States or adjoining shorelines. Facilities that could reasonably be expected to discharge oil into navigable waters in quantities that may be harmful are required to develop and implement Spill Prevention, Control and Countermeasures (SPCC) plans per the SPCC rule.

Occupational Safety and Health Administration

The Occupational Safety and Health Administration administers health standards that (1) provide regulations for safety in the workplace; (2) regulate construction safety; and (3) require a Hazards Communication Plan. The plan includes identification and inventory of all hazardous materials for which Material Safety Data Sheets would be maintained, and employee training in safe handling of said materials.

State

California Environmental Protection Agency

The California Environmental Protection Agency (Cal EPA) unifies California's environmental authority, consolidating the California Air Resources Board (CARB), State Water Resources Control Board (SWRCB), Regional Water Quality Control Board (RWQCB), Integrated Waste Management Board (IWMB), the DTSC, Office of Environmental Health Hazard Assessment, and the Department of Pesticide Regulation under one agency. The California Hazardous Waste Control Law is administered by Cal EPA's DTSC.

Department of Toxic Substance Control

The DTSC is the primary agency in California that regulates hazardous waste, administers clean-ups of existing contamination and looks for ways to reduce hazardous waste produced in California. The DTSC regulates hazardous waste in California primarily under the authority of RCRA and the California Health and Safety Code. The DTSC manages, maintains and monitors the Cortese list of hazardous waste sites. The Cortese list, or Hazardous Waste and Substances Sites List, is a planning resource used by the state, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites.

Integrated Waste Management Act

The Integrated Waste Management Act of 1989 (PRC 40050 et seq. or Assembly Bill (AB 939, codified in PRC 40000), administered by the California Integrated Waste Management Board, requires all local and county governments to adopt a Source Reduction and Recycling Element to identify means of reducing the amount of solid waste sent to landfills. This law sets reduction targets at 25 percent by the year 1995 and 50 percent by the year 2000. To assist local jurisdictions in achieving these targets, the California Solid Waste Reuse and Recycling Access Act of

1991 requires all new developments to include adequate, accessible, and convenient areas for collecting and loading recyclable and green waste materials.

Local

Riverside Code Section 8.124 (Ordinance 650.5) – Septic System

This ordinance regulates the discharge of sewage in the unincorporated areas of Riverside County. An on-site water treatment system (OWTS) means any individual or community onsite wastewater treatment, pretreatment and dispersal system including septic systems. An application must be submitted to the Riverside County Department of Environmental Health (DEH) for approval, and the OWTS will be subject to an annual operating permit.

County of Riverside Department of Environmental Health

The County of Riverside DEH acts as the Certified Unified Program Agency (CUPA) for Riverside County and is responsible for reviewing Hazardous Materials Business Plans. A CUPA is a local agency that has been certified by Cal EPA to implement state environmental programs related to hazardous materials and waste. The DEH is responsible for protecting the health and safety of the public and the environment of Riverside County by assuring that hazardous materials are properly handled and stored. The DEH accomplishes this through inspection, emergency response, site remediation and hazardous waste management services. The specific responsibilities of the DEH include the following:

- Inspecting hazardous material handlers and hazardous waste generators to ensure full compliance with laws and regulations.
- Implementing CUPA programs for the development of accident prevention and emergency plans, proper installation, monitoring, and closure of underground storage tanks and the handling, storage and transportation and disposal of hazardous wastes.
- Providing 24-hour response to emergency incidents involving hazardous materials or wastes in order to protect the public and the environment from accidental releases and illegal activities.
- Overseeing the investigation and remediation of environmental contamination due to releases from underground storage tanks, hazardous waste containers, chemical processes or the transportation of hazardous materials.
- Conducting investigations and taking enforcement action as necessary against anyone who disposes of hazardous waste illegally or otherwise manages hazardous materials or wastes in violation of federal, state or local laws and regulations.

3.21.2 Solid and Hazardous Wastes Existing Conditions

The DHSP is located in eastern Riverside County. The solar facility would be north of the community of Desert Center and just south of the Desert Sunlight Solar Farm project, which is currently under construction. The environmental baseline for the proposed project and alternatives includes the preliminary construction of the Desert Sunlight Solar Farm project as of the commencement of analysis for this EIS in September 2011.

Non-Hazardous Wastes

The Riverside County Waste Management Department (RCWMD) is responsible for providing landfill capacity for non-hazardous waste materials within Riverside County. RCWMD operates six landfills (Badlands, Blythe, Desert Center, Lamb Canyon, Mecca II, and Oasis) and has a contract agreement for waste disposal with an additional private landfill (El Sobrante). RCWMD also administers several transfer station leases. RCWMD ensures that Riverside County has a minimum of 15 years of capacity, at any time, for future landfill disposal. (RCWMD 2011a)

Hazardous Wastes

A hazardous material is any substance that, because of its quantity, concentration, or physical or chemical properties, may pose a hazard to human health and the environment. Under Title 22 of the California Code of Regulations (CCR), the term "hazardous substance" refers to both hazardous materials and hazardous wastes. Both of these are classified according to four properties: (1) toxicity; (2) ignitability; (3) corrosiveness; and (4) reactivity (CCR Title 22, Chapter 11, and Article 3). A hazardous material is defined in CCR, Title 22 as:

> *. . . A substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed* (CCR, Title 22, Section 66260.10).

Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Hazards to human health and the environment can occur during production, storage, transportation, use, or disposal of hazardous materials. There are no known hazardous wastes on the solar facility site. Hazardous wastes in the region are discussed in Section 3.13 (Public Health and Safety).

A comprehensive list of Registered Hazardous Waste Transporters Serving Riverside County is provided and updated by the Riverside County Department of Environmental Health, Environmental Protection and Oversight Division (RCWMD 2011b).

3.22 CDCA PLAN CONFORMANCE

The proposed project and alternatives would be developed on federal and private lands that are administered by the BLM and Riverside County, respectively. In the CDCA Plan, the Desert Harvest Solar Project (DHSP) site includes land that is classified as Multiple-Use Class M (Moderate Use) and the gen-tie line Alternative E would cross land that is classified as Multiple-Use Class L (Limited). Gen-tie line alternatives B, C, and D would also cross a very small portion of land classified as Multiple-Use Class L as they enter the Red Bluff Substation. The Plan states that solar power facilities may be allowed within Moderate and Limited Use areas after NEPA requirements are met. Within Multiple Use Class M the CDCA Plan allows for transmission lines above 161 kV within designated corridors. If a new transmission line is proposed that is above 161 kV and not within a designated corridor, either the CDCA Plan could be amended to designate a new corridor or the CDCA Plan could be amended to 'allow' the transmission line outside a corridor. This EIS is the mechanism for complying with the NEPA requirements.

3.22.1 Existing California Desert Conservation Area Plan and Amendments

The 25-million-acre CDCA was designated by Congress in 1976 through the Federal Land Policy Management Act (FLPMA) of 1976. The area, which encompasses portions of the Mojave, Sonoran, and Great Basin Deserts, currently contains approximately 11 million acres of BLM-administered public lands. The 1980 CDCA Plan, as amended, serves as the land use guide for the management, use, development and protection of public lands within the CDCA. Public lands within the CDCA are managed based on the concepts of multiple-use, sustained yield, and maintenance of environmental quality. The DHSP site would be located on federal lands under the BLM's jurisdiction within the CDCA and would, therefore, be subject to the provisions of the CDCA Plan (as amended).

The goal of the CDCA Plan is to provide for the use of the public lands and resources of the CDCA, including economic, educational, scientific, and recreational uses, in a manner that enhances without diminishing the environmental, cultural, and aesthetic values of the desert and its productivity. This goal is to be achieved through the direction given for management actions and resolution of conflicts outlined in the CDCA Plan. Direction is provided for BLM-administered public lands in four multiple-use classes. The multiple-use classifications describe the type and level or degree of use that is permitted within geographic areas. Further refinement of direction of management of resources within the CDCA is expressed in the goals for motorized vehicle access, geology, energy production and utility corridors and in certain site specific Plan decisions such as Areas of Critical Environmental Concern (ACECs).

While renewable energy development is allowed within the multiple-use class guidelines of the CDCA Plan, the Plan provides that a plan amendment is required for renewable energy projects not previously identified in the Plan.

The ROW required for the solar facility site is within an area that is designated as Multiple-Use Class M (Moderate Use) according to the CDCA Plan (BLM 1980a, as amended), and the 1988 Plan Amendments (BLM 1989). The Multiple-Use Class M designation is intended to control balance between higher intensity use and protection of public lands. Public lands designated as Class M are managed generally to provide for a wide variety or present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is

also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause.

The Energy Production and Utility Corridors Element of the CDCA Plan (BLM 1980a, as amended) recognizes the CDCA as an area where energy production facilities and utility corridors could be located. The element outlines BLM's management decisions for designation and implementation of a network of planning (utility) corridors to meet the projected utility needs through the year 2000 and siting procedures for power plants and alternative energy sources. A site-specific NEPA analysis is required for all applications for a ROW for any transmission line, regardless of whether the transmission line is in a corridor. In addition, implementation decisions outlined in the element indicate that an amendment to the CDCA Plan is required for all power generation facilities not specifically identified in the CDCA Plan.

Sixteen joint-use planning (utility) corridors varying in width from 2 to 5 miles are identified in the CDCA Plan, as amended. These corridors are intended to include new electrical transmission lines of 161 kV or above, all pipelines with diameters greater than 12 inches, and major aqueducts or canals for inter-basin transfers of water. According to the CDCA Plan, applications for utility ROWs will be encouraged to use designated corridors by BLM management.

Planning Criteria

Because solar power facilities and transmission lines are allowable uses of the proposed project and alternatives site as it is classified in the CDCA Plan, they would not conflict with the Plan. However, Chapter 3, "Energy Production and Utility Corridors Element" of the Plan also requires that sites associated with power generation and transmission not already identified in the Plan be considered through the Plan Amendment process. According to guidance issued by the BLM California Desert District in 2008 (in response to IM No. 2007-097), an amendment to the CDCA Plan is required for authorization of all power generation facility ROW sited on BLM-administered public lands within the CDCA. The site for the solar facility is not currently identified within the Plan; therefore, Plan Amendment is required to include that site as a recognized solar generation location within the planning boundary. Approval of this power generation site would result in an amendment to the Energy Production and Utility Corridors Element. The specific amendment, should a development action alternative be chosen, would state that the Desert Harvest Solar Project is allowed.

For transmission lines above 161 kV proposed outside a designated corridor, either the CDCA Plan could be amended to designate a new corridor or the CDCA Plan could be amended to 'allow' the transmission line outside a corridor. Portions of gen-tie line Alternatives B through E would not be within a currently designated corridor and a plan amendment would be required to allow the development of these gen-tie line alternatives. The specific amendment, should a gen-tie action alternative be chosen, would state that the Desert Harvest Solar 220 kV Gen-Tie is allowed outside a designated corridor.

The CDCA Plan planning criteria are the constraints and ground rules that guide and direct the development of the Plan Amendment. They ensure that the Plan Amendment is tailored to the identified issues and ensure that unnecessary data collection and analyses are avoided. As specified in Chapter 7, Plan Amendment Process, there are three categories of Plan Amendments, including:

- Category 1, for proposed changes that will not result in significant environmental impact or analysis through an Environmental Impact Statement;
- Category 2, for proposed changes that would require a significant change in the location or extent of a multiple-use class designation; and
- Category 3, to accommodate a request for a specific use or activity that will require analysis beyond the Plan Amendment Decision.

Based on these criteria, approval of the proposed project or action alternatives would require a Category 3 amendment. This chapter summarizes the procedures necessary to evaluate the proposed Plan Amendment, as well as the procedures required to perform the environmental review of the ROW application.

Statement of Plan Amendment

The Implementation section of the Energy Production and Utility Corridors Element of the CDCA Plan lists a number of Category 3 amendments that have been approved since adoption of the Plan in 1980. To be compliant with the CDCA Plan, Alternatives 4 through 7 would require the following amendment for the generation facility: "The Desert Harvest Solar Generation Project is allowed." To be compliant with the CDCA Plan, the following amendment would be required for the gen-tie line Alternatives B through E: "The 220 kV gen-tie line that serves the DSHP is 'allowed' outside of a designated corridor." The possibility of creating a corridor for the gen-tie line was also considered by the BLM for the gen-tie line alternatives. However, sufficient use of a corridor in this area is not expected to justify such a designation.

Plan Amendment Process

The Plan Amendment process is outlined in Chapter 7 of the Plan. In analyzing an applicant's request for amending or changing the Plan, the BLM State Director, California State Office, will:

- Determine if the request has been properly submitted and if any law or regulation prohibits granting the requested amendment.
- Determine if alternative locations within the CDCA are available which would meet the applicant's needs without requiring a change in the Plan's classification, or an amendment to any Plan element.
- Determine the environmental effects of granting and/or implementing the applicant's request.
- Consider the economic and social impacts of granting and/or implementing the applicant's request.
- Provide opportunities for and consideration of public comment on the proposed amendment, including input from the public and from federal, State, and local government agencies.
- Evaluate the effect of the proposed amendment on BLM management's desert-wide obligation to achieve and maintain a balance between resource use and resource protection.

Decision Criteria for Evaluation of Proposed Plan Amendment

The Decision Criteria to be used for approval or disapproval of the proposed amendment require that the following determinations be made by the BLM State Director:

- The proposed amendment is in accordance with applicable laws and regulations;
- The proposed amendment will provide for the immediate and future management, use, development, and protection of the public lands within the CDCA.

The BLM State Director will base the rationale for these determinations on the principles of multiple use, sustained yield, and maintenance of environmental quality as required in the FLPMA of 1976. Multiple use is defined as management of public lands and their resource values in a combination that best meets the needs of present and future Americans, using some land for less than all of the resources, taking into account balanced and diverse use with long-term needs, and coordinating management of various resources without permanent impairment of productivity and environmental quality considering the relative values of the resources. Sustained yield is defined as achievement and maintenance in perpetuity of a high level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use. In this context, the authorized officer will determine whether the Proposed Action comports with these FLPMA principles.

Decision Criteria for Evaluation of Application

In addition to defining the required analyses and Decision Criteria for Plan Amendments, the Plan also defines the Decision Criteria to be used to evaluate future applications in the Energy Production and Utility Corridors Element of Chapter 3. These Decision Criteria include:

- Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors;
- Encourage joint-use of corridors for transmission lines, canals, pipelines, and cables;
- Provide alternative corridors to be considered during processing of applications;
- Avoid sensitive resources wherever possible;
- Conform to local plans whenever possible;
- Consider wilderness values and be consistent with final wilderness recommendations;
- Complete the delivery systems network;
- Consider ongoing projects for which decisions have been made; and
- Consider corridor networks which take into account power needs and alternative fuel resources.

Factors to be Considered

The Plan also states that, in the evaluation of proposed power plants, BLM will use the same factors affecting the public lands and their resources as those used by the Energy Commission. At the time the CDCA Plan was written, those factors included:

- Consistency with the Desert Plan,
- Protection of air quality,
- Impact on adjacent wilderness and sensitive resources,
- Visual quality,
- Fuel sources and delivery systems,
- Cooling-water sources,
- Waste disposal,

- Seismic hazards, and
- Regional equity.

These factors are now considered to include the environmental information requirements defined in the California Code of Regulations (CCR) Title 20, Appendix B, which include:

- General (Project Overview)
- Cultural Resources
- Land Use
- Noise
- Traffic and Transportation
- Visual Resources
- Socioeconomics
- Air Quality
- Public Health
- Hazardous Materials Handling
- Worker Safety
- Biological Resources
- Water Resources
- Soils
- Paleontological Resources
- Geological Hazards and Resources
- Transmission System Safety and Nuisance
- Facility Design
- Transmission System Design
- Reliability
- Efficiency

3.22.2 Determinations Required for the California Desert Conservation Area Plan

Required Determinations

The specific determinations required for the Plan Amendment evaluation are discussed in detail below in Table 3.22-1, Plan Amendment Determinations. This EIS acts as the mechanism for evaluating both the proposed project application, and the proposed Plan Amendment. The factors specified in CCR Title 20, Appendix B are included within the scope of the analysis presented in the EIS.

Table 3.22-1. Plan Amendment Determinations

Determinations	Conformance
Determine if the request has been properly submitted and if any law or regulation prohibits granting the requested amendment.	The Applicant's request for a right-of-way was properly submitted, and this EIS acts as the mechanism for evaluating and disclosing environmental impacts associated with that application. No law or regulation prohibits granting the amendment.
Determine if alternative locations within the CDCA are available which would meet the applicant's needs without requiring a change in the Plan's classification, or an amendment to any Plan element.	The CDCA Plan does not currently identify any available sites as solar generating facilities. Therefore, there is no other location on public land within the CDCA which could serve as an alternative location without requiring a Plan Amendment. The solar facility does not require a change in the Multiple-Use Class classification.
Determine the environmental effects of granting and/or implementing the applicant's request.	This EIS acts as the mechanism for evaluating the environmental effects of granting the right-of-way and the Plan Amendment.
Consider the economic and social impacts of granting and/or implementing the applicant's request.	This EIS acts as the mechanism for evaluating the economic and social impacts of granting the right-of-way and the Plan Amendment.

Table 3.22-1. Plan Amendment Determinations

Determinations	Conformance
Provide opportunities for and consideration of public comment on the proposed draft plan amendment, including input from the public and from federal, State, and local government agencies.	A Notice of Intent (NOI) to amend the CDCA Plan was published in the Federal Register September 15, 2011, Vol. 76, No. 179 Fed. Reg. 57073-57074. Public scoping meetings were held in October 2011 and public and agency comment opportunities are provided during the EIS process. A Notice of Availability for public and agency review was published on April 18, 2012, which initiated a 90-day public comment period for the Draft EIS and Draft Plan Amendment. The comment period from April 18, 2012 to July 17, 2012. Additionally, public hearings were held on May 14, 2012. A Notice of Availability for the Final EIS and proposed Plan Amendment will be published in the Federal Register which will initiate a 30-day protest period on the proposed PA to the Director of the BLM in accordance with 43 CFR 1610.5-2.
Evaluate the effect of the proposed amendment on BLM management's desert-wide obligation to achieve and maintain a balance between resource use and resource protection.	The balance between resource use and resource protection is evaluated within the EIS. Title VI of the FLPMA, under California Desert Conservation Area, provides for the immediate and future protection and administration of the public lands in the California desert within the framework of a program of multiple use and sustained yield, and maintenance of environmental quality. Multiple use includes the use of renewable energy resources, and through Title V of FLPMA, the BLM is authorized to grant rights-of-way for generation and transmission of electric energy. The acceptability of use of public lands within the CDCA for this purpose is recognized through the Plan's approval of solar generating facilities within Multiple-Use Class M. The purpose of the EIS is to identify resources which may be adversely impacted by approval of the proposed project, evaluate alternative actions which may accomplish the purpose and need with a lesser degree of resource impacts, and identify mitigation measures and Best Management Practices (BMPs) which, when implemented, would reduce the extent and magnitude of the impacts and provide a greater degree of resource protection.

Because solar electric facilities are allowed under Multiple-Use Class M designations, the DHSP is consistent with the CDCA multiple-use class designations and is not anticipated to require a plan amendment for reclassification of the project site for the solar facility. The gen-tie alternatives would also be located on Class M and Class L lands. Electrical transmission and distribution facilities may be allowed on Class M and Class L outside designated utility corridors after NEPA requirements are met and a plan amendment is approved. Gen-tie Alternatives B, C, D, and E are not within a utility corridor and require a plan amendment to allow a 220 kV transmission line outside of a designated utility corridor.

The CDCA Plan, as amended, states that the same criteria used for determining decisions within the CDCA Energy Production and Utility Corridors Element would also be used to evaluate applications for specific electrical ROW or power plant sites. The conformity of the Proposed Action with the CDCA Plan's Energy Production and Utility Corridors Element Decision Criteria is shown in Table 3.22-2, Conformity with the CDCA Area Plan's Energy Production and Utility Corridors Element Decision Criteria.

Table 3.22-2. Conformity with the CDCA Area Plan's Energy Production and Utility Corridors Element Decision Criteria

Decision Criteria	Compliance
Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors	Although the Proposed Action will require a separate ROW, the intent of this element is somewhat met in that the action alternatives are in close proximity to the Desert Sunlight Solar Farm project and its associated linear facilities, which would allow better planning.
Encourage joint-use of corridors for transmission lines, canals, pipelines, and cables	Placement of the Proposed Action adjacent to existing facilities and proposing a joint use of the Desert Sunlight transmission towers or ROW somewhat meets the intend of this element. Although the proposed project is not within a designated corridor joint use was encouraged in the alternatives development for the EIS. One gen-tie line alternative would be collocated on poles on an "allowed" transmission line and one gen-tie line alternative would parallel an "allowed transmission line".
Provide alternative corridors to be considered during processing of applications	Alternative site locations were considered during the planning process and are discussed in Chapter 2, Description of the Proposed Action and Alternatives. No designated corridor is available for the gen-tie line alternatives from the generation site to the substation. One gen-tie line alternative would be collocated on poles on an "allowed" transmission line.
Avoid sensitive resources wherever possible	The extent to which the Proposed Action has been located and designed to avoid sensitive resources is addressed throughout the EIS. BLM and other federal regulations that restrict the placement of proposed facilities, such as the presence of designated Wilderness Areas or Desert Wildlife Management Areas were considerations in the original siting process used by the Applicant and discussed with BLM during pre-application proceedings (43 CFR 2804.10) to identify potential project locations. The proposed project location and configurations of the boundaries were modified in consideration of sensitive resources.
Conform to local plans whenever possible	The extent to which the Proposed Action conforms to local plans is addressed within the Land Use chapter of the EIS. The Proposed Action is in conformance with the Riverside County General Plan.
Consider wilderness values and be consistent with final wilderness recommendations	The Proposed Action is not located within a designated Wilderness Area or Wilderness Study Area. Wilderness characteristics of the proposed project and alternatives sites are evaluated in the EIS for example in Section 4.17, Special Designations, and in Section 4.19, Visual Resources.
Complete the delivery systems network	This decision criterion is not applicable to the Proposed Action.
Consider ongoing projects for which decisions have been made	This decision criterion is not applicable to the Proposed Action. Approval of the proposed project would not affect any other projects for which decisions have been made.
Consider corridor networks which take into account power needs and alternative fuel resources	This decision criterion is not applicable to the Proposed Action. The Proposed Action does not involve the consideration of an addition to or modification of the corridor network. However, it does utilize existing facilities, which were designed with consideration of both power needs and locations of alternative fuel resources.

Regulatory Requirements

Section 202 of FLPMA states: "The Secretary shall, with public involvement . . . develop, maintain, and when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands" (43 United States Code [USC] 1712). The regulations for making and modifying land use plans and planning decisions are found in Title 43 of the CFR Part 1600.

The proposed land use plan amendment is to follow the regulations as set forth in Title 43 CFR Part 1610, Resource Management Planning, which requires that an interdisciplinary approach be taken in amending resource management plans (RMPs), where the disciplines of the preparers shall be appropriate to the values involved and the issues identified for the amendment. The amendment is to be analyzed through the NEPA process, in which the public and federal, state, and local governments are to be provided opportunities to meaningfully participate in and comment on the preparation of the amendment and be given early notice of planning activities.

The analysis and public involvement for the land use plan amendment coincides, to the extent possible, with the public notices, hearings, and comment periods of the EIS. The land use plan amendment and identification of major issues are discussed and analyzed within the technical resource chapters of this EIS. Potential effects and mitigation measures resulting from the land use plan amendment, if required, are evaluated and discussed relevant to each technical resource area.

The Record of Decision will address the EIS, including both the land use plan amendment under the BLM planning regulations, and the project under the BLM ROW regulations and NEPA.

Because the Draft EIS also evaluated a BLM draft land use plan amendment, the public review period lasted 90 days from the date the Notice of Availability of the draft EIS was published in the Federal Register (43 CFR 1610.2) by the EPA. The proposed revisions to the CDCA Plan (as outlined in Chapter 7 of the CDCA Plan, as amended) and of the necessary ROW required for the project would be approved by a decision maker at the level of the California State Director, or higher.

The planning regulations include an opportunity for protest (43 CFR 1610.5-2). The protest period extends 30 days from the date that the Environmental Protection Agency publishes the Notice of Availability of the final EIS containing the proposed plan amendments in the Federal Register. A letter of protest must be filed with the BLM Director within 30 days of the EPA notice. The Director may dismiss or uphold a protest, in whole or in part. The BLM will withhold approval and implementation on any protested portion of a plan amendment until the protest process has been completed. Portions of the plan amendment not being protested may be approved and implemented.

EPA's notice simultaneously initiates the Governor's consistency review. The Governor has a maximum of 60 days to identify inconsistencies between the proposed plan and state and local plans and provide written comments to the BLM California State Director. The BLM and the state may mutually agree upon a shorter review period satisfactory to both parties.

Once protests have been resolved and the Governor's consistency review has been completed, the BLM State Director may approve the plan amendment and/or the Proposed Action or one of its alternatives. These decisions, if signed by a decision maker in the Department of the Interior, are the final decision of the U.S. Department of the Interior and cannot be appealed to the

Interior Board of Land Appeals. If the decision is signed by a decision maker at the BLM then the implementation decisions (non-plan amendment) may be appealed to the Interior Board of Land Appeals.